This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

B 428192

TA
24.
.L8

REPORT

OF THE

BOARD OF STATE ENGINEERS

OF THE

STATE OF LOUISIANA

TO

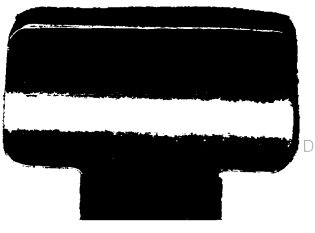
HIS EXCELLENCY MURPHY J. FOSTER,
GOVERNOR OF LOUISIANA,

FROM

APRIL 20, 1894, TO APRIL 20, 1896.

BATON ROUGE:
PRINTED BY THE NEWS PUBLISHING COMPANY.
1896.

Digitized by Google



Digitized by Google

Ref. Ch.
Library
Louisiana State University
11-2-1934

Report of the Board of State Engineers.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, La., April 20, 1896.

To His Excellency Murphy J. Foster, Governor of Louisiana:

SIR:—The Board of State Engineers respectfully submits the following report, covering the period from April 20, 1894, to April 20, 1896.

DUTIES OF THE BOARD.

The duties devolving upon the Board, under Act 33, of 1879, by which it was created, are to make surveys of water courses, public works and levees of the State, report to the Governor the levees and improvements necessary to be constructed; examine and measure the work so done under State contracts, and certify amounts for payment. Also to make such surveys as may be required by parochial authorities in the repair and construction of levees and other public works, and to take charge of and preserve the records and archives of the State Engineer Department.

Under subsequent laws they have been made, in general terms, the engineers and advisers of the Boards of Levee Commissioners of the several levee districts of the State, as follows: The Fifth Louisiana Levee District, by Act 44, of 1886; the Tensas Basin Levee District, by Act 59, of 1886; the Red River, Atchafalaya and Bayou Bœuf Levee District, by Act 79, of 1890; the Pontchartrain Levee District, by Act 95, of 1890; the Atchafalaya Basin Levee District, by Act 97, of 1890; the Lafourche Basin Levee District by Act 13, of 1892; the Lake Borgne Basin Levee District, by Act 14, of 1892; the Caddo Levee District, by Act 74,

Digitized by Google

of 1892; the Bossier Levee District, by Act 89, of 1892; the Buras Levee District, by Act 18, of 1894, and the Cat Island Levee District, by Act 110, of 1894.

Under Act 79, of 1892, it is the duty of the Board to approve or disapprove the location, construction and repairs of levees on the river front of the Orleans Levee District; and Act 144, of 1888, makes it a duty of the Board to furnish lines, levels, plans and estimates for the execution of work on the New Basin Canal.

During the period covered by this report, Assistant State Engineer Lewis has given special attention to the work required in the Lafourche Basin, Lake Borgne Basin and Buras Levee Districts; Assistant State Engineer Thompson, to that in the Fifth Louisiana and Pontchartrain Levee Districts; Assistant State Engineer Kerr, to that in the Caddo, Bossier, and Red River, Atchafalaya and Bayou Bœuf Levee Districts, and Assistant State Engineer Perrilliat, to that in the Atchafalaya Basin Levee District. None of the members of the Board, however, have confined their attention exclusively to any particular district; all of them having attended to such duties as the occasion required in any locality or district.

The regular staff of office employees has consisted of W. H. Hoffman, secretary; T. L. Raymond, principal draughtsman; A. C. Duval, assistant draughtsman, and for a part of the time, Geo. J. Stoutz, and subsequently L. E. Bowman, clerk and typewriter, and Robert L. Harris, porter.

The field work has required the constant services of W. S. White and J. A. Fox, surveyors; and of W. M. Marshall and R. J. Smith, rodmen; as well as the occasional employment of other assistants, in the same capacity.

The duties entrusted to the several assistants, above named, have been performed with commendable skill and industry, and the successful accomplishment of the work in charge of the Board has been largely due to the intelligence and fidelity of its employees.

Digitized by Google

LEVEE WORK OF THE PAST TWO YEARS.

The results of the work accomplished since April 20, 1894, by the several levee districts, the State and the United States, in Louisiana and in that part of Arkansas, upon which we depend for protection, sum up approximately as follows:

WORK DONE.	Miles of New Levee Built.	Miles of Levee Raised and Enlarged.	Cubic Yards of Earthwork.	COST.
By the Levee Districts	52.58	103.25	4,868,812	$ 686,283 22
By the State	23.76	66.15	2,777,806	293,008 27
By the United States	98.93	201.30	12,018,289	1,419,245 46
Aggregates	175.27	370.70	19,664,907	$ 2,398,536 95

In addition to the above, a considerable sum has been expended by the several levee districts and by the United States for the clearing, protection and minor repairs of levees; and wooden revetments, aggregating about eleven miles in length, have been built by some of the levee districts in the lower part of the State at a cost of about $19,000.00.

Details as to location, character, extent and cost of the levee work of the past two years will be found in the following remarks relative to "The Levee Districts," and in tabular form, in Appendix A.

THE LEVEE DISTRICTS.

Two new levee districts were created by the General Assembly at its last session, so that there are now twelve such districts with corporate powers in the State, covering nearly all of the alluvial territory except in the middle section of Red River, where the construction and maintenance of such levees as are necessary are still generally considered as not beyond the resources of private enterprise.

Digitized by Google

The Tensas Basin Levee District has undertaken no new work during the past two years, though work under two contracts of earlier date, not completed on April 20, 1894, have since been finished. The levees on which the district depends for protection have been greatly improved by the extensive work done by the United States. The approximate length of new levee built in Chicot and Desha counties, Arkansas, below the present head of the system on Amos Bayou, is 20.50 miles, and of levee raised and enlarged, 23.85 miles; involving 3,474,949 cubic yards of earthwork, at a cost of about $416,318.06, which includes 73,268 cubic yards, costing $11,722.88, done by the Tensas Basin Levee District. The United States has also built about 12.40 miles of levee on the Arkansas River, below Red Fork, containing about 839,484 cubic yards of earth work, and costing about $75,757.46, which largely aids in protecting the Tensas Basin Levee District from overflow. The district now has in contemplation some work needed in consequence of caving bank on the Ouachita River.

In the Fifth Louisiana Levee District the greater portion of the work has been that of raising and enlarging the levees to the uniform standard adopted for new and improved levees during the season of 1893–94. The work of this character amounts to 142.76 miles in length; while the length of new levees built during the same period aggregates about 10.97 miles. The total work done during the past two years amounts to 3,593,360 cubic yards of earthwork at a cost of about $476,980.34, divided as follows: by the district, 40 miles of levee enlargement, containing 719,026 cubic yards, and costing $118.868.52; by the State, 0.17 miles of new levee and 20.52 miles of enlargement, containing 570,307 cubic yards, and costing $60,829.81; by the United States, 10.80 miles of new levee and 82.24 miles of enlargement, containing 2,304,027 cubic yards, and costing about $297,282.01.

The general condition of the levee system of the district is now far superior to that reported April 20, 1894, and should inspire still greater confidence in its efficiency as a defense against

Digitized by Google

overflow; although there remain large portions of the line which need additional height and strength, to place them on an equality with the best parts of the system.

While the location of the entire line is at this time further removed from danger of caving into the river than ever before, still there are changes of channel going on in nearly all the concave bends which may necessitate the construction of some large and extensive new levees in the near future.

During the past two years the General Government has placed a substantial bank revetment along the most threatened portion of the Elton Bend, just above Lake Providence, and it is hoped that this work will prevent the necessity for constructing the large and expensive levee which, without some such preventive, would, undoubtedly, have become necessary in the near future.

The means available during the past two seasons have not been sufficient to permit the extension of the levee system of the district from Bougere Landing to the mouth of Red River, but it is hoped that this desirable work—roughly estimated at 1,200,000 cubic yards—may be accomplished within the next few years.

Under Act 48, of 1894, "Cotton grown in that portion of Concordia parish, affected by the waters from Bougere Crevasse," was exempted from the increased limit of special assessment authorized by the act, on cotton produced in the district, during the years 1894, 1895 and 1896; and the Board of State Engineers was required to report to the Levee Commissioners what cultivated lands in the parish are affected by water from this crevasse, etc. No lands cultivated in cotton were overflowed by the waters from Bougere Crevasse during the season of 1894 or of 1895. (See report of Sept. 15, 1894, in Appendix B.)

In the Atchafalaya Basin Levee District, from April 20, 1894, to April 20, 1896, work has been done by the State and district authorities on 52.43 miles of levees, representing 2,165,934 cubic yards, at a cost of $285,998.83. Of this, 22.26 miles has been the construction of new levees, and 30.17 miles has been enlarging of

Digitized by Google

existing lines. The work was distributed as follows: 15 miles done on the Mississippi River, 13 miles on the Atchafalaya River, and 24.43 miles on the Bayou Lafourche. In addition to this the United States Government has done 34.20 miles of work on the Mississippi River levees, represented by 1,508,398 cubic yards of earth, at an approximate cost of $171,502.31.

The work thus done from the above mentioned sources, can be divided and summed up as follows: By the district, 17.90 miles of new levees and 27.70 miles of enlargement, represented by 1,795,207 cubic yards of earth, at a cost of $240,778.56; by the State, 4.36 miles of new levees and 2.47 miles of enlargement, represented by 370,727 cubic yards of earth, at a cost of $45,220.27; by the United States Government, 13.40 miles of new levees and 20.80 miles of enlargement, represented by 1,508,398 cubic yards of earth, at an approximate cost of $171,502.31. The totals of the above figures would show that 35.66 miles of new levees had been constructed, and 50-97 miles of enlargement, representing 3,674,332 cubic yards, at a cost of $457,501.14.

The work undertaken by the State has, at the request of the Board of Levee Commissioners, been done on Bayou Lafourche. The district work has been done on all three streams, the Mississippi River, Atchafalaya River and Bayou Lafourche; the bulk of it, however, being done on the two last mentioned. The United States Government has confined its operations to the Mississippi River.

The levees on the Mississippi River in this district are now, with a very few exceptions, 2½ feet or more above the highest water plane of the past, and those which are not, will be brought to that standard before the close of the year. Moreover, fully ⅞ of this Mississippi River line is 3 feet, or more, above high water, while some of the levees have been built to a grade of 4 feet above high water. The section of these levees are all standard; that is, they have 6, or more, feet of crown with slopes of 3 to 1 on both river and land sides.

Digitized by Google

On the Atchafalaya River the levee line has been extended continuously down stream from Garwood Bayou to Mussel Bayou, by the building of 7½ miles of new levees, and most of the levees which were below the three foot standard, between Garwood Bayou and Barbre's Landing, have been and are being raised to this standard height and section.

On Bayou Lafourche the levees from Donaldsonville to Lafourche Crossing, a distance of 39 miles, have been brought up to a standard of 3 feet above the highest water, with slopes of 3 to 1 on the river side, and 2 to 1 on the land side, and a small amount of work has been done below Lafourche Crossing, but the bulk of the work is yet to be done on the levees below that point.

It might be interesting to state that, of the work mentioned above, as having been done during the past two years, 2,065,612 cubic yards, at a cost of $246,485.01, was done on the Mississippi River; 518,098 cubic yards, at a cost of $73,227.32, was done on the Atchafalaya River, and 1,090,622 cubic yards, at a cost of $137,788.81, was done on Bayou Lafourche.

The Cat Island Levee District, in the parish of West Feliciana, created by Act 110, of 1894, consists of the alluvial territory on the left bank of the Mississippi River, from Ratcliff's Landing to Bayou Sara. Commissioners were appointed and organized as a Board early in September, 1894. A preliminary estimate of the levee work required to protect the district against direct overflow from the Mississippi River, was prepared from the information then available, which showed that something like 2,000,000 cubic yards of earthwork would be necessary for a levee 3 feet above high water mark; and that if an opening were left for drainage into the river at the lower end of the district, the highest stages of the river would give back water over nearly its entire area.

Considering the magnitude of the work requisite for protecting the district, and the uncertainty of deriving revenues commensurate with the expenditure involved, from the sources

Digitized by Google

authorized by the organic act, the Board of Commissioners wisely concluded to indefinitely defer action, and hence no work has been undertaken in the district.

Surveys were made by the direction of the Mississippi River Commission, in October, 1895, to ascertain the quantity and cost of levee work necessary to prevent direct overflow of this district and the area subject to overflow, and a copy of the map showing the results of this survey has been kindly supplied us by Capt. Derby, Corps of Engineers, U. S. Army. This map confirms the conclusions previously reached as to the extent of overflow probable from backwater, and gives an estimate for levees required of about 27.70 miles in length, and containing 1,826,000 cubic yards of earthwork, at a cost of $229,100.00. It also gives the area of cleared land at 29,000 acres. In view of these figures, and of the evident probability that when levees are built, the drainage of the district during prolonged seasons of high water can only be preserved by providing pumping machinery, it does not appear likely that much levee work will be found advisable in this district for some time to come.

The Pontchartrain Levee District, during the past two years, has been financially unable to undertake any very extensive levee work. The injury and destruction attending the flood of 1892 made it imperative upon the district, during the season of 1893–94, to incur expenditures and create obligations for the repair of damages and to preserve itself from further disasters, from the effects of which—notwithstanding the relief granted by the act authorizing a further issue of bonds, passed at the last session of the General Assembly—it is only just recovering. The Commissioners, however, have built and enlarged a number of levees and have done a considerable amount of work in keeping the line free from weeds, and in the construction of revetments at some of the places most exposed to wave-wash.

Fortunately the levee work of the State and the United States in the district, has continued to supplement the earliest work of

Digitized by Google

the District Levee Board, so that now its system of levees is believed to compare favorably in size and security with that of any district in the State.

The total work done by contract in the district during the past two years amounts to 1,967,855 cubic yards of earthwork, at a cost of about $218,188.82, divided as follows: by the district, 0.07 miles of enlargement and 41,327 cubic yards, costing $11,916.88; by the State, 0.10 miles of new levee, 8.00 miles of enlargement and 283,916 cubic yards, costing $37,405.39, and by the United States, 16.23 miles of new levee, 27.66 miles of enlargement and 1,642,612 cubic yards, costing about $168,866.55.

In the Lafourche Basin Levee District, the levee work undertaken by the State and district for the past two years, has been the building of 11.65 miles of new levee and the enlargement of 10.94 miles of existing old levees on Bayou Lafourche, which stream forms the western boundary of the district. There is yet considerable levee work to be done on the Lafourche to bring the remaining levees up to a standard grade and section.

The district has also expended in minor repairs in various parts of the district, such as cutting out and refilling crayfish holes, restoring wave-wash, repair of revetments and mowing weeds, some $14,294.27.

The United States has built 13.32 miles of new levee and 33.54 miles of enlargement of existing levees, fronting the Mississippi river.

The total work done in the district during the past two years amounts to 24.97 miles of new levee, 44.48 miles of enlargement and 2,446,985 cubic yards of earthwork, at a cost of about $279,344.88, divided as follows: by the district, 8.34 miles of new levee, 9.99 miles of enlargement and 894,764 cubic yards, costing $86,476.70; by the State, 3.31 miles of new levee, 0.95 miles of enlargement and 293,987 cubic yards, costing $34,431.15, and by the United States, 13.32 miles of new levee, 33.54 miles of enlargement and 1,258,234 cubic yards, costing about $158,437.03.

Digitized by Google

From the organization of this district, August 4, 1892, to date, there have been placed on the levees by contract, exclusive of what has been done by day's work, over 7,000,000 cubic yards of earthwork; of this amount, over 5,000,000 cubic yards have been placed on the 120 miles of levee fronting the Mississippi river, the eastern boundary of the district.

The Orleans Levee District has continued the improvement of its levees, especially of those forming its interior system on the left bank, which have been considerably extended and enlarged within the past two years. The Commissioners have also recently begun work on a large pumping plant to provide drainage for the lower end of the district, on the left bank.

The following particulars relative to the levees of the district, and the work done since April 20, 1894, have been kindly furnished by Mr. A. C. Bell, Engineer of the Orleans Levee Board:

"Length of levee line, right bank of Mississippi River, 13.81 miles; left bank, 12.64 miles. In addition to this, there are 39.68 miles of interior levees; making a total of 66.13 miles in the district, constructed, and raised and enlarged by the Board."

"Grade of levees on the Mississippi River compared with the high water of 1893, left bank, 7.84 miles, three (3) feet above, 4.80 miles, two (2) feet above; right bank, 11.14 miles, three (3) feet above, and 2.67 miles, two (2) feet above."

"Length of levee lines built, 11.67 miles; length of levees raised and enlarged, 13.14 miles. Cubic yards of earth, about 577,368; cost, $104,937.00."

"Length of revetments and bulkheads built, 5.18 miles, at cost of about $24,700."

In the Lake Borgne Basin Levee District, the District Levee Board has expended during the past two years $11,039.06 in repair work, such as restoring wave-wash and the cutting out and refilling of crayfish holes, the repair and renewal of revet-

Digitized by Google

ments and the mowing and weeding of levees, in addition to the work of levee enlargement done under contract by the cubic yard.

The total work in the district done by contract amounts to 7.37 miles of new levee, 13.65 miles of enlargement and 515,298 cubic yards of earthwork, at a cost of about $64,039.80, divided as follows: By the district, 0.35 miles of enlargement and 999 cubic yards of earthwork, at a cost of $124.87; by the State, 0.56 miles of new levee, 6.07 miles of enlargement and 101,439 cubic yards of earthwork, at a cost of $11,779.45; and by the United States, 6.81 miles of new levee, 7.23 miles of enlargement and 412,860 cubic yards of earthwork, at a cost of about $52,135.48.

The Buras Levee District, created by Act 18, of 1894, consists of that portion of the alluvial territory contained within the parish of Plaquemines, beginning at the lower line of Riceland Plantation and extending to the Jump on the west, or right bank, of the Mississippi River. It includes all lands belonging to and forming part of this parish, south of a line drawn from the lower line of the Riceland Plantation to the limits of Harang Canal, on Bayou Lafourche. The length of the existing levee line is about 34 miles.

Commissioners were appointed, organizing as a Board on August 4, 1894, when a report was submitted (see Appendix B), giving an approximate estimate in detail of nearly half a million cubic yards required to be built, raise and enlarge the levees throughout this district.

The destructive violence of the storm of October 1, 1893, followed by the severe freezes of the winter of 1895, have crippled the resources of this district to such an extent that it has not been able so far, to do much more than keep its present levee line intact, and to make such minor repairs as restoring wave-wash, repair and renewal of revetments and cutting out and refilling crayfish holes.

For this character of work the district has expended up to

Digitized by Google

date $6713.78. The total earthwork done by contract amounts to 1.69 miles of new levee, 5.82 miles of enlargement, containing 97,157 cubic yards, at a cost of about $12,485.63, divided as follows: By the district, 0.19 miles of new levee and 2.31 miles of enlargement, containing 22,544 cubic yards, and costing $3393.19; by the State, 1.18 miles of new levee and 2.11 miles of enlargement, containing 39,796 cubic yards, and costing $5042.60, and by the United States, 0.32 miles of new levee and 1.40 miles of enlargement, containing 34,817 cubic yards and costing about $4049.84.

In the Caddo Levee District, the work undertaken and done during the two years covered by this report, is as follows: By the district, new levee, 12.33 miles; enlargement, 4.50 miles; amounting to 512,602 cubic yards and costing $75,643.93; in addition to which $1132.79 was expended by the district in constructing bulkheads to protect the angles of the levee at Cedar Bluff, and the lower end of the Staten Point Levee, abutting on Tone's Bayou, and as a bonus to the contractor on the State work at Coushatta and Dooley Bayou; by the State, new levee, 1.26 miles, enlargement, 16.32 miles; amounting to 301,103 cubic yards and costing $34,251.60; by the United States, new levee, 2.60 miles, enlargement, 4.58 miles; amounting to 354,720.5 cubic yards and costing $48,996.16. In addition to the above, $1,201.00 was expended by the United States on a revetment at Red Bayou and bulkheads at the upper end of the Red Bayou Levee, and at the lower end of the Staten Point Levee, abutting on Tone's Bayou.

This aggregates 16.19 miles of new levee, 25.40 miles of enlargement, 1,168,425.5 cubic yards of earthwork and an expenditure of $161,225.48. All of the work is completed except the State work at the Brown Plantation, about 20 miles below Shreveport.

The river front of the Caddo Levee District is about 120 miles in length, but owing to the sinuosities of Red River, public

Digitized by Google

UNIVERSITY OF MICHIGAN

safety and economy necessitate the location of the line of public levee across many of the most pronounced points, instead of following around them, parallel to the general direction of the stream, as is usual in most other localities. In this way the length of the public system in the Caddo Levee District, when completed, will probably not exceed 90 miles. Of this, 63 miles has so far been built, or improved to a grade not less than 3 feet above the highest known water which has so far prevailed in Red River, with fairly proportionate cross-sections. This leaves something like 25 miles of levee line still to be undertaken; which, with the improvement in grade and section that may be shown to be necessary in certain localities, will require not less than 2,500,000 cubic yards of earthwork.

In conformity with a resolution of the Caddo Levee Board, under Act 90, of 1894, an examination of the territory lying between Red River and the lakes, from Shreveport to Cottonwood Bayou, was made by the Board of State Engineers in November, 1894, for the purpose of determining whether, in its opinion, it was impolitic on account of natural difficulties to attempt to protect the same by levees from the overflow from Red River. This examination resulted in the exemption of a large part of the area named, from the operations of the act under which the Caddo Levee District performs its functions. A report of the Board of State Engineers on this subject will be found in Appendix B.

In the Bossier Levee District, the work undertaken and done during the same period, is as follows: by the district, new levee, 1.94 miles, enlargement, 0.98 miles and 145,010 cubic yards, costing $21,470.89; in addition to which the sum of $17,500.00 was paid by the district towards the cost of the State work, from Knox Point to Buckhorn, and $2500.00 on that from Hurricane Bluff to Willow Chute; by the State, new levee 8.09 miles, enlargement 4.98 miles and 393,741 cubic yards, costing $22,845.76; and by the United States, new levee 2.55 miles, amounting to 261,455.4 cubic yards, and costing $38,023.44, including $400.00

Digitized by Google

for cutting old levee in front of new line, filling washouts and redressing and sodding portions of new line where grass had been killed by excessive cold weather.

The aggregrate of the above is 12.58 miles of new levee, 5.96 miles of enlargement, 800,206.4 cubic yards of earthwork and an expenditure of $102,340.09; all of which is completed except a part of the work of enlarging the Willow Bend Levee, about twelve miles above Shreveport, undertaken by the State.

Similar to the Caddo Levee District, and for the same reasons, the length of the line of the public levee in the Bossier Levee District will, when completed, be only about 60 miles in length, as opposed to 85 miles of river front. Of the 60 miles of levee line that will eventually be required for this district about 50 miles has already been built and improved to a grade of about 3 feet above the highest water so far known in Red River. This leaves about 10 miles now only partially and imperfectly leveed, over which an improved system remains to be extended. The work necessary for this extension, and to give all parts of the line already improved an equal promise of security against overflow, with that probably requisite for the further raising and enlargement of grades and sections, which may be found necessary as the floods are more completely confined, will involve not less than 1,000,000 cubic yards of earthwork.

In the Red River, Atchafalaya and Bayou Bœuf Levee District, the work done in the past two years is as follows: by the district, new levee 0.21 miles, enlargement 4.21 miles and 86,697 cubic yards, costing $10,949.80; by the State, new levee 4.74 miles, enlargement 4.70 miles, amounting to 422,790 cubic yards, costing $41,202.24. This presents a total of 4.95 miles of new levee, 8.91 miles of enlargement and 509,487 cubic yards of earthwork, costing $52,152.04.

With the exception of the district work, recently undertaken on Bayou des Glaizes, extending from Simmsport to Yellow Bayou, all of the work undertaken in the district in the past two years has been completed.

Digitized by Google

The length of the public system in this district, upon which the resources of the district and the State have so far been applied, is about 103½ miles. While the greater part of this length of line has been greatly improved, much still remains to be done to the line as a whole, to bring it up to a uniform degree of security, not to mention the extensions required upon Red River, Bayou des Glaizes and the Atchafalaya River, to meet the demands of the comprehensive levee system contemplated in the law under which the operations of the district are conducted.

The earthwork required at this time to adjust all parts of the present line of levees in the district to a standard equal to its best parts, and to provide for probable breaches from caving and crevasses, will involve not less than 1,000,000 cubic yards, and the extensions at least as much more.

Again, the extensions, when completed, will make it necessary to improve and provide drainage for several basins in the district which now find natural escape for accumulated rain water at points which the extensions will close.

All of this, together with the care, preservation and protection of the line when built and improved, will necessitate the application of all the resources that the district can command, under existing laws, for many years to come.

NEW BASIN CANAL AND SHELL ROAD.

Within the past two years the Board of Control of this important State property has made decided improvements in the condition of this canal. Several contracts for dredging have been completed and others are in contemplation. The entrance to the canal at West End now has ample depth at all stages of the lake. Substantial revetments have been built there and along the banks of the canal, at other places in the vicinity.

Surveys and specifications for the execution of dredge work and the construction of revetments at several places, have been made by the Board of State Engineers; the most important of which are designed for the improvement of the Basin, between

Digitized by Google

Magnolia street and its head, at Rampart street. It is proposed to build a very strong and substantial pile revetment along the banks of this basin, and to dredge its entire area to a depth of not less than eight feet.

When this work is executed the facilities for the discharge and loading of vessels navigating the canal will be vastly improved, and with some further work, which may be undertaken later, the condition of the property will be far better than ever before. Under careful management, such as it has been under of late, it should yield a revenue sufficient to keep it in perfect order and repair.

RIGHT OF THE STATE TO BUILD LEVEES ON PRIVATE PROPERTY.

The decision of the Supreme Court of the United States, in the case of Eldridge vs. Trezevant, rendered January 6, 1896 (U. S. Reports, Vol. 160, p. 452), affirming the jurisprudence of the State courts as to the right of the State to take and occupy lands for the construction of levees, without compensation, is a matter of great public importance, as it is understood to finally settle all questions on this much controverted subject. Had the court held the interpretation given to the Constitution and laws by the State tribunals to be in error, there can be no doubt that numerous suits would have been brought for the recovery of damages, and that endless litigation might have followed, to the great detriment of the public welfare.

The Fifth Louisiana Levee District has borne the cost of defending this suit, as it arose from the construction of a State levee in that district; but, considering the importance to the entire State of the questions involved and now decided, it has been suggested that the State should reimburse the district for at least some part of its outlay for this purpose, and that an appropriation should be made therefor, by the Legislature. This view of the case seems reasonable and proper, and the appropriation of any equitable sum for reimbursement that may be asked for by the district authorities would appear to be a simple act of justice.

Digitized by Google

IMPROVEMENT OF THE LEVEE SYSTEM.

The extent to which our levees have been improved within the past 14 years can hardly be appreciated, even by those who have been closely connected with the work, without a review of the situation as it was previous to 1882, when the first allotment of funds for levee work was made from the appropriations by the General Government for river improvement.

At that time the old embankments in Desha and Chicot counties, Arkansas, which had once served to a part of Louisiana, as a partial protection against overflow, were in ruins and scarcely entitled to the name of levees. In Louisiana the line along the Mississippi had not yet been restored to the continuity it had 20 years earlier. Great crevasses had remained open from 8 to 15 years at Ashton, Diamond Island, Glasscock's, Bougere, Morganza and Bonnet Carre, with no means available for their closure. The levees on Red River and Bayou des Glaizes had been for a long period almost entirely neglected for lack of means to keep them in repair, so that the fragmentary system formerly existing there had been greatly delapidated, and afforded but little general protection.

On the east bank of the Atchafalaya, the levees—except for a few miles near its head, and a fragment here and there, further down—had utterly disappeared; while on the west bank they were barely enough to hold the water until it ran over and escaped on the opposite side. On Bayou Lafourche—largely by private enterprise—the line had been kept continuous; that is, where crevasses occurred, they had been closed before the next flood season, but the embankments were so narrow and steep, and so punctured with rice-flumes, and riddled with crayfish holes, that it seemed a continual miracle that they held back the water at all.

Generally speaking, the levees everywhere were low and weak to a degree which can only be fully understood by those who have watched, year after year, the slow and laborious pro-

Digitized by Google

cess by which they have attained a larger growth. The sections shown on the accompanying plates (Nos. 1 to 10, Appendix C), taken from actual measurements of levees in various parts of the State which have been raised and enlarged, fail to present the irregular, wave-washed, weedy and hog-rooted appearance which many of the old-time levees had, or to convey a just idea of the contrast between the old and the new. They are only given to illustrate one phase of the improvement which has been thus far effected. Not only were the levees of that date generally low and weak as compared with those of the present, but they were also many miles of their length located so near the edge of the caving river banks that comparatively slight recession of the bank frequently required the building of a new piece of levee to cover a breach in the line, and the insufficiency of funds would seldom permit the new line to be of such length and cost as should be necessary to put it back from the bank far enough to last any considerable time; and hence, there arose frequent necessity for such renewals.

Lack of means had, also, for many years caused levees to be built without such careful preparation of the ground on which they were built as is now required, and hence many roots and stumps were left under the levees of that day, thereby adding to their insecurity. Moreover, the laws of the State still permitted the insertion or existence of flumes and pipes through and under the levees, almost without control or limit.

And finally, the total funds then available for levee work in the State amounted to only about $250,000.00 per annum, while the prices at which earthwork could be put under contract averaged at least 100 per cent. more than those for which it has been done in recent years, due to the increased competition resulting from the larger quantity of work offered—which has attracted contractors from a wider field—and to the more general use of mules and scrapers in place of men with wheelbarrows in the execution of the work.

Digitized by Google

The floods of 1882 so generally overwhelmed and breached the levees and brought such disaster and devastation to the alluvial region of Louisiana and the adjacent States, that large numbers of its inhabitants were ready to abandon hope and effort, as well as land and residence; and it is doubtful whether the larger portion of the territory then overflowed would not have been depopulated and have remained uncultivated to gradually revert to a wilderness, but for the allotment of funds made in August, 1882, by the Mississippi River Commission for the constructions of levees as a means to aid in the improvement of navigation.

This allotment of funds from the appropriations by Congress for the improvement of the Mississippi river, gave new courage at a critical moment to our people, and marks an era in the history of levee construction. From that time forward there has been no cessation of the work of improvement, nor any general loss of confidence among intelligent people in the final success of the levee system, though a number of destructive floods and numerous crevasses have occurred, and the progress of the work has sometimes seemed to barely keep pace with the increased height and volume of the waters.

Another, and even more important, impetus was given to the work when, in 1886, the Tensas Basin Levee District and the Fifth Louisiana Levee District were incorporated by acts of Legislature, with Commissioners invested with greatly enlarged powers for raising revenues, and with authority to issue bonds, and do all things necessary and possible for constructing levees and protecting their districts from overflow. The General Assembly of 1890, created the Atchafalaya Basin Levee District and the Pontchartrain Levee District, with similar corporate powers, as also, the Orleans Levee District and the Red River, Atchafalaya and Bayou Bœuf Levee District, and each succeeding Legislature has incorporated new levee districts of the same character, until nearly all of the alluvial portion of the State is embraced within the 12 corporate levee districts, now existing.

Digitized by Google

Other State laws enacted during this period have exerted an important influence upon the improvement of the levees, such as Act No. 12, of 1884, transferring money derived from the sale of swamp lands to the levee funds; Act No. 84, of 1884, requiring parochial authorities to cause hogs found at large on the levees to be killed; Joint Resolution No. 112, of 1884, proposing amendment to Article 214 of the Constitution, and Act No. 8, of 1888, putting the amendment in effect, by which the limit of district levee tax was increased from 5 mills to 10 mills on the dollar; Act No. 108, of 1888, prohibiting riding, hauling or driving on the public levees; Act No. 60, of 1890, prohibiting live stock from going upon the levees during high water; Act No. 5, of 1892, prohibiting the insertion of pipes, flumes and other conduits in or through the levees, and requiring the removal of those existing, and Act No. 16, of 1892, prohibiting the placing of buildings, fences and materials upon the public levees.

Several acts of Congress have also been of value in promoting the improvement of levees in other ways than by the simple appropriation of money; such as the provisions of the acts, approved September 19, 1890, making it unlawful to build upon, alter, deface, destroy or injure any levee built by the United States; and, especially, the authority given by the act of July 13, 1892, to make the continuing contracts for work for the improvement of the Mississippi River.

A line of decisions of the State courts, affirming the constitutionality of the acts creating the levee districts and confirming the powers granted in these acts for raising revenues by taxation, local assessment and the issuance of bonds, has facilitated the administration of the affairs of the levee districts; and other decisions of the Federal courts sustaining the jurisprudence of the State, regarding the right to locate and build public levees on private property, has tended to prevent vexatious delays and to avoid the necessity for further litigation.

These fortunate events and circumstances, with an increas-

Digitized by Google

ingly favorable public sentiment, have resulted, under the fostering care of the executive, in an improvement which the following figures may measure and define, but which no one can truly appreciate except by contrasting the present with the past.

Since the flood of 1882 the levee lines within the State and and those in Arkansas, which directly protect this State against overflow—that is, those on and below Amos Bayou in Desha county, and the line connecting the Louisiana levees on Red River with Blanton's Bluff in Lafayette county—have been extended about 100 miles, where no public levees had previously existed.

All the great crevasses which, as above stated, had remained open for years previous—except the Bougere Crevasse, in Concordia Parish—have been closed with substantial levees.

The line has been made continuous in the levee districts bordering the Mississippi River, as follows:

(1.) From the Costello Place, on Amos Bayou, Desha county, Arkansas, to Bougere Landing on the Mississippi River, Concordia parish, Louisiana, a length of levee line down Amos Bayou, Cypress Creek and the Mississippi River, right bank, of 311 miles.

(2.) From Mussel Bayou on the Atchalafaya River, Pointe Coupee parish, to about 3 miles below the "Cut-Off," or 7 miles below Harang Canal, on Bayou Lafourche, Lafourche parish; a length of levee line up the Atchafalaya, left bank, and down the Mississippi and Lafourche, right bank, of 232.7 miles.

(3.) From 1 mile above Cheramie Canal, on Bayou Lafourche, Lafourche parish, to the Jump, on the Mississippi River, Plaquemines parish; a length of levee line up Bayou Lafourche, left bank, and down the Mississippi River, right bank, of 242.7 miles.

(4.) From Baton Rouge to Bohemia, in Plaquemines parish; a length of levee down the Mississippi River, left bank, of 186.6

Digitized by Google

miles; in addition to which there are 23 miles of levees extending further down, to Fort St. Philip, and not included in any levee district.

On Red River there are continuous stretches of levee, as follows:

(1.) From Blanton Bluff, Lafayette county, Arkansas, to lower side of Sale & Murphy Canal, Caddo parish; a length of levee line down Red River, right bank, of 3 miles.

(2.) From a point about 3 miles above Red Bayou to Hurricane Bluff Plantation; a length of levee line down Red River, right bank, in Caddo parish, of 22.5 miles.

(3.) From upper side of Bayou Pierre to upper side of Tone's Bayou, a length of levee line down Red River, right bank in Caddo parish, of 12.5 miles.

(4.) From a point on Bayou Pierre, in Caddo parish, 9 miles below Tone's Bayou, to near Bayou La Chute, in Red River parish; a length of levee line up Bayou Pierre and Tone's Bayou, left bank, and down Red River, right bank, of 36 miles. About 9 miles of the upper end of this stretch (i. e., the line of Bayou Pierre) and about 2 miles of the lower end (i. e., the part in Red River parish) were built by private parties, and are not considered as district levees.

(5.) From the high lands near Hurricane Bluff to the Buckhorn Plantation, a length of levee line down Red River, left bank, in Bossier parish, of 55 miles.

(6.) From a point on Bayou Rapides about 2.5 miles above Alexandria to Laborde's, about a mile above Choctaw Bayou, a length of leveee line down Bayou Rapides and Red River, right bank, in the parishes of Rapides and Avoyelles, of 37.5 miles.

(7.) From "The Junction" of Bayou Rouge and Bayou des Glaizes, Avoyelles parish, to the Texas and Pacific Railroad embankment at Melville, St. Landry parish; a distance by the levee line down Bayou des Glaizes and the Atchafalaya river, right bank, in Avoyelles and St. Landry parishes, of 66 miles; of which

Digitized by Google

about 30 miles on Bayou des Glaizes has not yet been improved and enlarged to the same extent as that in other parts of this district.

There are other stretches of levee of less length and importance, and a number of detached dikes, closing outlet bayous, etc., along the Red, Ouachita, Black, Tensas and Little Rivers. Some of them have been built or enlarged since 1882, by the State or by other public authority, though most of them are not usually taken into account as forming parts of the public levee system.

The aggregate length of the eleven stretches of continuous levee, above described, is 1,228.5 miles, of which fully 800 miles has been built or enlarged within the past fourteen years, to grades not less than 3 feet above the highest recorded stages of the water in the streams they border.

This work has involved the construction of 939 miles of new levee, besides more or less enlargement of nearly the entire line; while the earthwork executed amounts to nearly 97,000,000 cubic yards, and the cost of the work to not less than $17,350,000.00.

NEED FOR FURTHER IMPROVEMENT.

It is not to be presumed that the system of levees requisite for the entire restraint and control of great floods in our larger rivers will ever be so completed as to render further work and expense unnecessary for its preservation, repair and maintenance; and, so long as caving banks continue—as they will until revetted and held at immense cost—there must be a considerable annual outlay for renewal of parts of the line breached or threatened by such caving.

But it is reasonable to expect that the time may not be far distant when the existing system will be so far extended, enlarged and improved in condition as to prove an efficient defense against any flood by which—judging from the recorded experience of the past—it is probable we shall ever be visited; though much remains to be done to provide such a system.

For the thorough protection against direct overflow of those parts of the State now incorporated in levee districts, it will be

Digitized by Google

necessary not only to further extend the lines in several instances, but also to considerably increase the height and base of the existing levees, notwithstanding the great enlargement already made to them.

Of the extensions needed, the most important appear to be at the upper and lower ends of the line now existing from the Costello place, in Desha county, Arkansas, to Bougere Landing, in Concordia parish, Louisiana. This line should either be extended further up Amos Bayou Ridge, or else the levees on the Arkansas River should be extended down to near the mouth of Cypress Creek; and the old levees on the Arkansas, from Red Fork nearly up to Pine Bluff, should also be in great part re-located and renewed, and all greatly enlarged. At the lower end of the line it is necessary that a large levee be built through the old Bougere Crevasse, and the line thence extended down to the mouth of Red or Old River.

Indefinite extension of the levee lines is desirable down Bayou Lafourche, though the closure of this delta stream at its head, or the construction of a lock there, in accordance with the project long since adopted by Congress, would forever do away with all further necessity for levees on its banks.

The Cat Island Levee District would require a line of new levees on its entire front; though for reasons elsewhere stated, it seems unlikely that this can be profitably undertaken in the near future.

On the Atchafalaya River extensions should be made from Mussel Bayou as far at least as Bayou Alabama, on the left bank; and from Melville to Bayou Courtableau, on the right bank.

On Red River, the systematic construction of public levees, has, so far, been confined to the Caddo, Bossier and the Red River, Atchafalaya and Bayou Bœuf Levee Districts, and, while the work done by the combined efforts of the Boards of Commissioners of these districts, the State and the United States, has been prosecuted with energy and foresight and aggregates amounts of considerable magnitude in length of line and earthwork handled,

Digitized by Google

much still remains to be done in these districts in the way of extension, improved grades and sections, and in drainage, to insure an equal degree of security throughout their lengths, not to speak of immunity from overflow.

Among the most important extensions to the existing lines in these districts, that should first command attention are, in the order named in the districts:

1. In the Caddo Levee District, the gap from Sale & Murphy Canal to the Red Bayou Levee, recently completed by the United States Government; from the Hurricane Bluff Plantation to Shreveport; and ultimately the closure of Tone's Bayou.

2. In the Bossier Levee District, from Buckhorn Plantation to Swift Chute Bayou.

3. In the Red River, Atchafalaya and Bayou Bœuf Districts, in Avoyelles parish, from Laborde's, across Bayou Choctaw, to the Avoyelles prairies.

The extensions above mentioned are more or less necessary for the protection of the levee districts as now incorporated. A considerably greater extension of levees would be necessary for the protection of other territory subject to overflow, not now included in any of the levee districts.

In undertaking the extension named in the Red River, Atchafalaya and Bayou Bœuf Levee District, the question of diverting the drainage of the large basin lying between Red River and Bayous Robert and Bœuf, from Red River, where it now finds its principal escape, during low water, into Bayou du Lac, Bayou des Glaizes and the Atchafalaya, or, by canal into Bayous Bœuf and Courtableau, or partly by both of these channels, must not be lost sight of.

The extent to which the improvement in the grades and sections of the levees in these districts must be eventually carried, will depend largely upon the lessons to be learned from the future conduct of the river, when, in its changed condition, by reason of confinement, it will be put to a test by the great floods that will, at some time or other, again visit it. Enough, however, is

Digitized by Google

now known, to select the following localities as requiring such enlargement; in the Caddo Levee District, from Crescent Place to Briarfield, and with the closure of Tone's Bayou from the upper side of Bayou Pierre to Caspiana; in the Bossier Levee Dirtrict, from Willow Bend to Dillards, and with the closure of Tone's Bayou, from Curtis' to Knox Point; in the Red River, Atchafalaya and Bayou Bœuf Levee District, from Bayou Rapides to Hudson's.

Again, Red River, for its greater length, is in a state of rapid development, entailing great changes in direction, width and depth, and the caving consequent upon this must, from time to time, in many places jeopardize, not only the lines of levees thus far built, but retire the natural banks on other parts of the river now supposed to be sufficiently elevated to restrain floods, to so much lower ground that lines of levees will thus become imperative in many localities, the necessity for which is not generally appreciated by the riparian dwellers at this time.

Viewed from these standpoints, the Board of State Engineers believes that, the work required for extending the system, adjusting grades and sections to such dimensions as developments may impose, closing breaches caused by future caving, and for the disposition of interior drainage interrupted by the extension of the levees, will demand the best efforts of all interested in the welfare and prosperity of the Red River Valley for a long while to come.

But it is probable that the greatest and most important work of improvement in the near future will be found to consist in bringing the levee lines along the Mississippi River to the higher grades and correspondingly larger sections which seem indicated as a necessary accompaniment to the approaching complete confinement of flood-waters between levees.

In their report upon the physics and hydraulics of the Mississippi River, of 1861, Messrs. Humphreys and Abbott state the proper heights required for levees "based upon the supposition of absolute security, so far as its conditions could be ascertained"

Digitized by Google

at that date, and in the report of the Commission of Engineers on a "plan for the reclamation of the alluvial basin of the Mississippi river subject to inundation," of 1875, General Abbott revised and slightly modified the figures of the former report. These heights were referred to the plane of high water of 1858, and were for levees with a margin of about 1 foot above the water of the greatest known floods "had the river been confined to its bed by a perfect levee system." The heights above the flood plane of 1858 range from 4.7 feet at Carrollton to 11 feet at Lake Providence.

In 1883, General Comstock, in a minority report of the Mississippi River Commission, suggested certain heights for levees, which, with a thorough system of levees, would have been required to restrain the flood of 1882, and have a margin of 3 feet above water. Lines showing these suggestions for proper height of levee with reference to the highest waters since gauge records have been systematically kept, have been plotted as far as it is possible to do so with the data available on Plate 11, Appendix C. The estimates of the probable heights of flood waters necessary to be provided for with a complete levee system appear to be quite similar in both cases, and to contemplate an increase of flood stage in the river at and above the upper part of this State which has generally been regarded as excessive. The views of Captain Eads represented the other extreme, and were so interpreted by many persons as to lead to the belief that no increase of the height of levees would become necessary for the confinement of floods.

The Board of State Engineers has always treated the subject of the proper height to be given the levees as a problem which can be most satisfactorily solved by experience; but has believed it probable that the final results will be found to lie, as is not unusual, between the extremes.

The tendency of nearly all recent investigations, alike with the results already evident—from such confinement of the floods as has thus far been accomplished, seems towards the conclusion that levees on the Mississippi River—at least in the upper part of this State and in that part of Arkansas from which we may be

Digitized by Google

directly overflowed—have not yet been built to grades of such height as will be necessary for safety when the floods are completely controlled. We believe that it will be found desirable, if not absolutely necessary for the completion of an efficient levee system, to raise the height of levees in which we are directly interested on the Mississippi, an average of something over 4 feet, above the mouth of Red River, and perhaps half as much below. To do this properly it is estimated that as much as fifty-five million cubic yards of earthwork will be required.

STAGE OF THE RIVERS DURING THE PAST TWO YEARS.

At the date of our report of April 20, 1894, the principal swell of the spring rise had already passed down the river, hardly attaining a stage at any point on the Mississippi River below Cairo entitling it to the name of a flood, and only on Red River reaching a stage, anywhere in Louisiana, to involve danger.

During the two years from that time to the present, there has been no stage of water in the Mississippi River below Cairo, or in Red River within this State much in excess of the heights reached in the spring of 1894. The highest records in 1894, 1895 and, up to this date, in 1896, at several gauges on the Mississippi, Red and Arkansas, are as follows:

	1894.		1895.		1896. Previous to April 20.	
Cairo, Mississippi River.....	Feb. 16	37.0	Mar. 26	33.3	April 13	39.2
Helena, Mississippi River.....	Feb. 21	38.1	April 1	31.4	April 17	38.4
Vicksburg, Mississippi River..	Feb. 27	40.3	April 4	31.7	April 20	38.8
New Orleans, Mississippi River	April 6	14.6	April 8	11.1	April 20	14.3
Shreveport, Red River.....	April 2	34.4	July 29	30.3	Feb. 24	17.4
Little Rock, Arkansas River....	Mar. 22	24.8	Dec. 27	23.2	Jan. 1	21.2

It is too soon to predict the heights to which the waters may yet rise this season, though nothing is now apparent to indicate the early probability of any dangerous flood. At this date the Mississippi is declining above Vicksburg, while nearly all the tributary streams are comparatively low and most of them falling.

The years 1894 and 1895 have been remarkable for the unusually low stages of the Mississippi, Red and Arkansas, prevailing during a prolonged period in the last three months of each year.

Digitized by Google

The general absence of high water during the past two years has permitted levee work to be carried on almost without interruption, and has given an opportunity for the growth of grass on the new earthwork, the value of which can hardly be too highly appreciated.

It has so frequently happened that a large part of the work done in any season has failed to become well covered with a firmly-rooted, protective growth of grass before it has been subjected to the washing of waves and the abrasion of drift logs, which usually accompany the spring floods, that the defacement, erosion and loss of material in place, thus caused, though not unexpected, has been sometimes discouraging and has always involved considerable expense for its restoration and repair.

Fortunately the work done before the spring of 1895, has been mostly exempt from such injury, and the present season, thus far, gives no sign of water high enough to greatly damage the unsodded embankments of recent execution.

While this respite from the dangers, losses and outlays consequent upon high water has been of great direct benefit to the levees, and an immense saving of means to the levee districts, there is reason to fear that it has somewhat relaxed public interest in the work of levee improvement, and that in some quarters it may have given color to the suggestion that taxation and expenditure for this purpose should be reduced. Should such conclusions prevail in the public mind, as a result of the exemption from floods with which we have been lately favored, the exemption certainly would prove a doubtful benefit, if not indeed, an actual injury to the welfare of the country.

IN CONCLUSION.

It is gratifying to note that although the stimulus to exertion usually supplied by the annual spring floods has been lacking for the past two years, and notwithstanding the depressed condition of trade and the low price of agricultural products prevailing during a large part of the time, there has been no general cessation of exertion on the part of the levee boards of the several districts,

Digitized by Google

nor any disposition manifested by them to abandon, delay or moderate their earnest endeavors towards the building and maintenance of a perfect system of levees. It is also understood that the prospects appear favorable for further appropriations by Congress for river improvement.

Should it become possible to do as much levee work during the next four years as has been done within the same time past by the combined efforts of the State, levee districts and the United States under the authority given by the Rivers and Harbors Act of 1892, for continuing contracts, it would not be a vain or unreasonable hope to believe that the levees along the Mississippi River, upon which this State is dependent for protection, may, by that time, be raised to a grade above any probable high water when completely confined between levees.

Such a consummation of the hopes and labors of three or four generations would mark an epoch in the history of Louisiana, more important than any since it became a State.

In concluding this report, we desire to record our obligations to the Mississippi River Commission and to its executive officers, especially Captains Townsend, Millis and Derby, Corps of Engineers, United States Army, and to Major Willard, of the same corps, in charge of the improvement of Red River, for their many acts of courtesy in supplying us with facilities for visiting their works and with information relative thereto, and to express our thanks to your Excellency for the patient attention and consideration which you have always given to our views and recommendations.

Respectfully submitted,

HENRY B. RICHARDSON,
Chief State Engineer.
SIDNEY F. LEWIS,
H. BOL. THOMPSON,
FRANK M. KERR,
ARSENE PERRILLIAT.
Assistant State Engineers.

Digitized by Google

APPENDIX A.

Tabulated Statements Showing Quantity, Length and Cost of Levee Work Undortaken by the State of Louisiana, the Several Boards of Levee Commissioners, the United States, etc., in Louisiana, and a part of Arkansas, from April 20, 1894, to April 20, 1896.

Digitized by Google

APENDIX A. STATEMENT

Levee work undertaken by the State of Louisiana in the several Levee
April 20, 1896, with two contracts of earlier

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
			FIFTH LOUISIANA LEVEE			
1	Christmas	Madison	Nov. 26, 1894	Nov. 27, 1895	.....	30,383
2	Palmyra Bend	Tensas	Nov. 26, 1894	....	880	81,000
	Totals		.....	.....	880	111,383
	Less work not completed April 20, 1896.		.....	.....	.....	3,000
	Work done from Apl. 20, '94 to Apl. 20, 1896		.....	.....	880 or 0.17 mls	108,383 or 20.52 ml
			ATCHAFALAYA BASIN LEVEE			
3	Upper Lafourche	Ascension and Assumption	Nov. 11, 1895	Mar. 12. 1896	1,937	7,204
4	Monnet	Lafourche	June 13, 1894	Feb. 28, 1895	12,435	5,554
5	Lafourche Crossing to Lockport	Lafourche	Nov. 13, 1895	.....	11,607	293
	Totals		.....	.....	25.979	13,051
	Less work not completed April 20, 1896.		.....	.....	2,946	.....
	Work done from Apl. 20, '94 to April 20, 1896		.....	.....	23,033 or 4.36 mls	13,051 or 2.47 mls
			PONTCHARTRAIN LEVEE			
6	College Point	St. James	Oct. 12, 1894	Feb 7, 1895	.....	10 000
7	Bagatelle	St. James	Jan. 20, 1896	Apr. 18, 1896	.....	1,730
8	La Place	St. John	Oct. 12, 1894	Feb. 7, 1895	.....	17,010
9	Victoria	St. Charles	Sept 11, 1895	Feb. 26, 1896	.....	5,625
10	Lower Jefferson	Jefferson	Nov. 1, 1895	Feb. 28, 1896	512	7,943
	Totals		.....	.....	512 or 0.10 mls	42,308 or 8.00 mls
			LAFOURCHE BASIN LEVEE			
11	Rienzi and China Grove	Lafourche	Sept. 18, 1894	Mar. 20, 1895	11,002	135
12	Bourg	Lafourche	Sept. 11, 1895	Feb. 29, 1896	4,682	2,185
13	Choctaw	Lafourche	Nov. 13, 1895	Mar. 30, 1896	1,788	2,710
	Totals		.....	.....	17,472 or 3.31 mls	5,030 or 0.95 mls

Digitized by Google

No. 1. STATE CONTRACTS.

Districts, under thirty-six contracts entered into from April 20, 1894, to date, not completed on April 20, 1894.

Cubic Yards	Price—Cents	COST: District Fund	COST: General Engineer Fund	STREAM	REMARKS
DISTRICT					
129,677	10.45	.....	$ 13,551 24	Mississippi Riv.	Includes work at Bayou Roundaway and Bedford's.
600,000	10.73	.....	64,380 00	Mississippi Riv.	Includes work at Woodburn, Ashwood, St. Joseph, Cottage Home and Bayou Vidal.
729,677	.....	.....	$77,931 24		
159,370	.....	.....	17,101 48		
570,307	.....	.....	$60,829 81		
DISTRICT					
56,227	10.24	.....	$ 5,757 64	Bayou Lafourche.....	Includes work at bridge, Palo Alto, St. Emma, School and Cox.
212,039	12.45	....	26,398 85	Bayou Lafourche	Includes new levees at Monnet, Eroche, Acadia, Rousseau, Cevin, and enlargement at other points.
149,064	12.75	.....	19,005 66	Bayou Lafourche.....	
417,380	.....	.....	51,162 15		
46,603	.....	....	5,941 88		
370,727	.....	.....	$45,220 27		
DISTRICT					
37,359	11.99	.....	$ 4,479 34	Mississippi Riv.	Includes work at Welham.
7,785	12.87	.....	1,001 93	Mississippi Riv.	
106,520	12.50	.....	13,315 00	Mississippi Riv.	
66,582	15.65	.....	10,420 08	Mississippi Riv.	
65,670	12.47	.....	8,189 04	Mississippi Riv.	
283,916	....	.....	$37,405 39		
DISTRICT					
162,046	11.	.....	$17,825 06	Bayou Lafourche	
96,119	11.50	.....	11,053 68	Bayou Lafourche.....	Includes work at Clotilda.
35,822	15 50	.....	5,552 41	Bayou Lafourche.....	Includes work at Ragan's.
293,987			$34,431 15		

Digitized by Google

APPENDIX A. STATEMENT

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
			LAKE BORGNE BASIN LEVEE			
14	Bellevue	Plaquemines	Jan. 10, 1896	Mar. 4, 1896		4,400
15	Section 7	Plaquemines	Nov. 26, 1894	Mar. 14, 1895		8,820
16	Section 8	Plaquemines	Sept. 11, 1895	Dec. 12, 1895	1,383	9,549
17	Section 8	Plaquemines	Nov. 26, 1894	Mar. 20, 1895	1,556	9,281
	Totals				2,939 or 0.56 mls.	32,050 or 6.07 mls.
			BURAS LEVEE			
18	Williams to Potash Store	Plaquemines	Nov. 13, 1895	Mar. 14, 1896	700	11,135
19	Fasterling	Plaquemines	Sept. 18, 1894	Jan. 17, 1895	1,738	
20	Metcalf	Plaquemines	Sept. 18, 1894	Jan. 17, 1895	3,779	
	Totals				6,217 or 1.18 mls.	11,135 or 2.11 mls.
			CADDO LEVEE			
21	Coushatta and Dooley Bayou	Caddo	Sept. 18, 1894	Mar. 2, 1895	941	12,059
22	Egypt Enlargement	Caddo	Sept. 17, 1895	Jan. 27, 1896		14,752
23	Cedar Bluff	Caddo	Sept. 18, 1894	Mar. 2, 1895		13,300
24	Wild Lucia and Crescent	Caddo	Sept. 18, 1894	Dec. 29, 1894		7,200
25	Uni and Briarfield	Caddo	Nov. 4, 1895	Feb. 25, 1896		16,975
26	Riverdale	Caddo	Nov. 4, 1895		4,090	9,193
27	Riverdale to Tones Bayou	Caddo	Apl. 27, 1894	July 17, 1894	492	9,283
28	Cash Crevasse	Caddo	Apl. 27, 1894	July 27, 1894	1,120	3,490
	Totals				6,643 or 1.26 mls.	86,192 or 16.32 mls.

Digitized by Google

No. 1—Continued. STATE CONTRACTS.

Cubic Yards	Price—Cents	COST: District Fund	COST: General Engineer Fund	STREAM	REMARKS
DISTRICT					
12,999	10.99	.....	$1,428 59	Mississippi Riv.	
28,921	10.90	.....	2,607 38	Mississippi Riv.	From Union to Favret's Store.
30,907	12	....	3,708 84	Mississippi Riv.	From Court-house to Bohemia.
33,622	12	....	4,034 64	Mississippi Riv.	Includes work at upper and lower Bohemia, Pierre Cosse's and Felix Hingle's.
101,439	.....	....	$11,779 45		
DISTRICT					
20,540	12.48	.....	$2 563 39	Mississippi Riv.	Includes work at Butler's.
6,752	12.⅞	....	869 62	Mississippi Riv.	
12,504	12.⅞	.....	1,609 89	Mississippi Riv.	
39,796	.....	.....	$5,042 60		
DISTRICT		Caddo Sub-Dist. Levee Fund.			
35,294	13.25	$2,699 42	$1,977 03	Red River.....	$152.79 additional paid by the Caddo Levee District.
21,762	9.89	.....	2,152 26	Red River.....	
53,564	12.38	3,631 22	3,000 00	Red River.....	
20,179	12.38	....	2,498 16	Red River.....	
32,747	9.49	.....	3,107 69	Red River,.....	
62,311	9.74	2,500 00	3,569 09	Red River.....	Includes work at Brown's and Cash's.
42,788	12.97	5,549 60	.....	Red River.....	
32,458	10.99	3,567 13	....	Red River.....	Includes work at Peace Point.
301,103	.....	$17.947 37	$16,304 23		

Digitized by Google

APPENDIX A. STATEMENT

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
					BOSSIER LEVEE	
29	Hurricane Bluff to Willow Chute	Bossier	Jan. 26, 1894	May 21, 1894	17,256	
30	Taylor	Bossier	Nov. 18, 1895		3,040	24,645
31	Schenicks Bayou	Bossier	June 26, 1893	May 4, 1894	7,150	20,852
32	Pruitt Crevasse	Bossier	Apl. 24, 1894	July 20, 1894	1,460	865
33	Sunflower	Bossier	Sept. 18, 1894	Mar. 4, 1895	3,492	800
34	Knox Point to Buckhorn	Bossier	Feb. 2, 1895	Apl. 27, 1895	33,577	
	Totals				65,975	47,162
	Less work done previous to April 20,		1894.		23,250	20.852
	Work done from April	20, 1894, to April	20, 1896.		42,725 or8.09mls	26,310 or4.98mls
					RED RIVER, ATCHAFALYA & BAYOU BŒUF	
35	Connella	Rapides	June 13, 1894	Nov. 2, 1894	3,300	7,827
36	Dorman	Rapides	June 13, 1894	Nov. 19, 1894	4,629	6,661
37	Wilson	Rapides	June 13, 1894	Nov. 21, 1894	6,231	4,857
38	Echo Landing	Rapides and Avoyelles	Sept. 11, 1895	Apl. 18, 1896	10,881	5.477
	Totals				25,041 or4.74mls	24.822 or4.70mls

Digitized by Google

No. 1—Continued. STATE CONTRACTS

Cubic Yards	Price—Cents	COST: Caddo Sub-Dist. Levee Fund	COST: General Engineer Fund	STREAM	REMARKS
DISTRICT					
102,383	.....	$ 6,500 00	.....	Red River.....	$2,500.00 additional paid by the Bossier Levee District.
91,000	9.73	1,854 80	$ 7,000 00	Red River.....	Includes enlargement at Willow Bend.
109,872	9.95	6,692 59	4,289 67	Red River.....	Includes work at Chalk Level, Sunflower, Clay, Hall and Bossier City.
30,441	14.50	.....	4,413 94	Red River.....	
49,077	9.⅓	1,580 52	3,000 00	Red River.....	
199,017	.....	3,497 00	.....	Red River.....	$17,500.00 additional paid by the Bossier Levee District.
581,790	.....	$20,124 41	$18,653 61		
188,049	.....	11,692 59	4,289 67		
393,741		$ 8,431 82	$14,413 94		
LEVEE DISTRICT					
		Natchitoches Sub-Dist. Levee Fund			
86,758	9.98	$ 6,100 00	$2,558 44	Red River.....	Includes work at Ashton.
91,378	9.44	5,400 00	3,226 08	Red River.....	Includes work at Carter's.
89,677	10.75	5,200 00	4,440 27	Red River.....	Includes work at Hatch's.
154,977	8.89	4,277 45	10,000 00	Red River	Includes $500.00 for repairs on Dorman Levee.
422,790		$20,977 45	$20,224 79		

Digitized by Google

APPENDIX A.

STATEMENT

RECAPITULATION.

DISTRICT	LINEAR FEET	
	New Levee	Enlargement
Fifth Louisiana Levee District	880	111,383
Atchafalaya Basin Levee District	25,979	13,051
Ponchartrain Levee District	512	42,308
Lafourche Basin Levee District	17,472	5,030
Lake Borgne Basin Levee District	2,939	32,050
Buras Levee District	6,217	11,135
Caddo Levee District	6,643	86,192
Bossier Levee District	65,975	47,162
Red River, Atchafalaya and Bayou Bœuf Levee District	25,041	24,822
Totals	151,658	373,133
Less work done previous to April 20th, 1894, and work not completed April 20th, 1896	26,196	23,852
Work done from April 20th, 1894, to April 29th, 1896	125,462 or 23.76 mls.	349,281 or 66.15 mls.

Digitized by Google

No. 1—Continued. STATE CONTRACTS.

CUBIC YARDS	COST	REMARKS
729,677	$ 77,931 24	
417,390	51,162 15	
283,916	37,405 39	
293,987	34,431 15	
101,439	11,779 45	
39,796	5,042 60	
301,103	34,251 60	
581,790	38,778 02	
422,790	41,202 24	
3,171,828	$ 331,983 84	
394,022	38,975 57	
2,777,806	$ 293,008 27	Average price 10.54 cents per cubic yards.

Digitized by Google

APPENDIX A. STATEMENT

Levee Work undertaken by the Board of Commissioners of the Tensas but not completed

Number.	NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
			Contract	Final Certificate	New Levee	Enlargement
1	Amos Bayou	Desha Co., Ark.		Aug. 10, 1894	26,670	
2	Rail Road	Desha Co., Ark.		Dec. 5, 1894		7,500
	Totals				26,670	7,500
Less work done previous to April 20, 1894					26,670	7,500
Work done from April 20, 1894, to April 20, 1896						

NOTE—The number of cubic yards given in the foregoing statement is based upon the Levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

Digitized by Google

No. 2. TENSAS BASIN LEVEE DISTRICT.

Basin Levee District, under two contracts previously entered into, on April 20, 1894.

Cubic Yards	Price—Cents	COST District Fund	REMARKS
144,440	16.	$23,110 40	
122,128	16.	19,540 48	
226,568	.....	42,650 88	
193,300	.....	30,928 00	
73.268	.....	11,722 88	Average price, 16 cents per cubic yards.

list of dimensions furnished and estimates made by the Board of State Engineers for the work, without regard to discount, interest, or other incidental expenses incurred

Digitized by Google

APPENDIX A. STATEMENT

Levee Work undertaken by the Board of Commissioners of the Fifth April 20, 1894, to April 20, 1896, with two contracts

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate.	LINEAR FEET New Levee	LINEAR FEET Enlargement
1	Bunche's Bend	East Carroll	Aug. 22,1894	Apr. 3, 1895		49,768
2	Wyly Crevasse Banquette	East Carroll	Aug. 22,1894	Jan. 21, 1895		4.520
3	Holly Brook	East Carroll	Aug. 6, 1894	June 3, 1895		10 060
4	Alsatia Banquette Extension	East Carroll	Nov. 7, 1893	Apr. 27, 1894		200
5	Salem Banquette and Carson Bayou	East Carroll	Aug. 22,1894	Apr. 29, 1895		10,637
6	Villa Vista Banquette	Madison	Aug. 22,1894	Aug. 5, 1895		15,352
7	Buckhorn	Madison	Aug. 6, 1894	May 4, 1895		7,025
8	Milliken's Bend Banquette	Madison	Aug. 22.1894	May 9, 1895		16,355
9	Milliken's Bend to Nebraska	Madison	Aug. 6, 1894	Mar. 28,1895		28,110
10	Willow Slough	Madison	Aug. 6, 1894	Mar. 26,1895		10.685
11	Willow Slough Ditch	Madison	July 6, 1894	Oct. 26, 1894		
12	Young's Pt. to Delta	Madison	Aug. 22. 1894	Feb. 2, 1895		20,400
13	Towne	Madison	Aug. 6. 1894	Dec. 26, 1894		8,180
14	Biggs	Madison	Nov. 15,1893	Apr. 27, 1894		7,120
15	Diamond Island	Madison	Aug. 22,1894	Apr. 3, 1895		17,442
16	Bruin's Bayou	Tensas	Aug. 6, 1894	July 11, 1895		5,765
17	Duck Pond	Tensas	Oct. 23, 1894	Nov. 15, 1894		7,445
18	Marshall	Tensas	Aug. 6, 1894	Oct. 23, 1894		4,105
	Totals.					218,169
	Less amount done previous to April 20, 1894					7,120
	Work done from Apri 120, 1894, to April 20, 1896					211,049 or40.0mls

NOTE.—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

Digitized by Google

No. 3. FIFTH LOUISIANA DISTRICT.

Louisiana Levee District, under sixteen contracts, entered into from of earlier date, not completed April 20, 1894.

Cubic Yards	Price—Cents	COST District Fund	STREAM	REMARKS
165,263	12.20	$ 20,162 45	Mississippi River.. .	
10,668	11.20	1,194 81	Mississippi River.....	
124,869	17.98	22.451 45	Mississippi River.....	
801	20.	160 20	Mississippi River.....	
28,852	11.44	3,300 67	Mississippi River.....	
30,788	12.23	3,765 37	Mississippi River.....	
22,725	13.21	3,001 84	Mississippi River.....	Includes Banquette at Rose Hill.
25,890	10.39	2,689 97	Mississippi River.....	
69.095	12.74	8.802 70	Mississippi River.....	
38,983	12.74	4,966 43	Mississippi River.....	
7,530	15.	1,129 50	.....	
20,478	12.45	2,549 51	Mississippi River.....	
21,079	12.74	2,685 45	Mississippi River.....	
41,024	28.	11,486 72	Mississippi River	
103,397	33.	34,121 01	Mississippi River.....	
24,451	12.74	3,115 06	Mississippi River.....	Includes work on Banquette above St. Joseph.
8,960	16.73	1,499 00	Mississippi River.....	
8.771	16.78	1,474 38	Mississippi River.....	
758,626	.....	$128,556 52		
34,600	.....	9.688 00		
719,026	.....	$118.868 52		Average price 16.53 cents per cubic yard.

list of dimensions furnished and estimates made, by the Board of State Engineers, for the work, without regard to discount, interest, or other incidental expenses incurred

Digitized by Google

APPENDIX A. STATEMENT

Levee work undertaken by the Board of Commissioners of the from April 20, 1894 to April 20, 1896, with three

Number	NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
			Contract	Final Certificate	New Levee	Enlargement
1	Lucky Hit	Pointe Coupee	Jan. 13, 1896	Apl. 4, 1896	737	6,439
2	Fairview	Pointe Coupee	Jan. 13, 1896	Apl. 10, 1896	.....	3,700
3	Kuhlman to Jones	Pointe Coupee	Jan. 13, 1896	.....	.....	12,268
4	S. L. James (Atchafalaya River	Pointe Coupee	Apl. 22, 1893	July 13, 1895	46,698	12,253
5	Hart and White (Atchafalaya River)	Pointe Coupee	July 3, 1895	.....	.....	30,680
6	S. L. James No. 1 (Mississippi River)	Pointe Coupee W. Baton R'ge Iberville and Ascension	Apl. 22, 1893	May 10, 1894	9,712	63,161
7	S. L. James No. 2 (Mississippi River and Bayou Lafourche)	Pointe Coupee W. Baton R'ge Iberville Ascension Assumption and Lafourche	Apl. 22, 1894	Apl. 30, 1895	7,115 32,686	57,503 18,963
8	Hart and White (Mississippi River and Bayou Lafourche)	Pointe Coupee Iberville Ascension and Assumption	July 3, 1895	.....	 14,903	3,365 8,983
9	Poplar Grove	W. Baton Rouge	July 6, 1895	Oct. 1, 1895	4,921	.....
10	Bayou Lafourche	Assumption and Lafourche	July 11, 1893	June 5, 1895	7,648	45,412
11	Dossat Store	Assumption	.....	Nov. 22, 1895	.....	3,390
12	Glenwood	Assumption	June 15, 1894	Dec. 28, 1895	.....	2,618
	Totals, (carry forward)	.....	.....	.....	124,420	268,735

Digitized by Google

No. 4. ATCHAFALAYA BASIN LEVEE DISTRICT.

Atchafalaya Basin Levee District, under nine contracts, entered into contracts of earlier date, not completed April 20, 1894

CUBIC YARDS	Price—Cents	COST District Fund	STREAM	REMARKS
29,898	10.	$ 2,989 80	Atchafalaya River ..	
14,160	11.45	1,621 32	Atchafalaya River ..	
48,615	10.73	5,216 89	Atchafalaya River ..	Includes work at Smith and Taylor, Means, Jenkins and School.
561,806	Scale of Prices	62,865 95	Atchafalaya River ..	Includes work at points bet. Marine Bayou and Cross Bayou.
98,362	Scale of Prices	16,586 11	Atchafalaya River ..	Includes work from Cypress Point to Garwood Bayou.
546,009	Scale of Prices	92,252 85	Mississippi River ...	
431,721	Scale of Prices	62,353 07	Mississippi River ...	Includes work at points on Mississippi River from Smithland to Donaldsonville, and on Bayou Lafourche from Donaldsonville to Thibodaux.
484,372		61,749 47	Bayou Lafourche	
3,195	Scale of Prices	304 43	Mississippi River ...	Includes work at Picayuneville and Plaquemine City, on the Mississippi River, and at Klotzville, Vivian, Capt. Aucoin, Bertrandville, Robertsonville, Elm Hall and Napoleonville, on Bayou Lafourche
233,872		22,455 82	Bayou Lafourche ...	
86,494	7	6,054 58	Mississippi River ...	
362,302	14	50,722 28	Bayou Lafourche.....	Includes work at various points between Cox's and Lafourche Crossing.
7,657	14	1,071 98	Bayou Lafourche.....	
14,112	Scale of Prices	1,818 22	Bayou Lafourche.....	
2,922,075		$ 408,061 77		

Digitized by Google

APPENDIX A. STATEMENT

	LINEAR FEET	
	New Levee	Enlargement
Totals brought forward	124,420	268,735
Less work done previous to April 20, 1894 and work not completed, April 20, 1896	29,794	122,192
Work done from April 20, 1894, to April 20, 1896	94,626 or 17.92 miles	146,543 or 27.73 miles

NOTE—In additiou to the work given in the foregoing statement, the Atchafalaya Basin Levee District expended, under the Bayou Lafourche and S. L. James' No, 2 Contracts, in payment of work done under force accounts.....

Total.....

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

Digitized by Google

No. 4—Continued. ATCHAFALAYA BASIN LEVEE DIST.

Cubic Yards	Price—Cents	COST District Fund	REMARKS
2,922,075	.....	$406,061 77	
1,126,868	.....	167,283 21	
1,795,207	.....	$240,778 56	Average price 13 41 cents per cubic yards.
... .	.....	1,903 77	
....	.....	$242.682 33	

list of dimensions furnished, and estimates made by the Board of State Engineers for the work, without regard to discount, interest, or other incidental expenses incurred

Digitized by Google

APPENDIX A. STATEMENT

Levee work undertaken by the Board of Commissioners of the April 20, 1894, to April 20, 1896, with seven contracts

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Contract	LINEAR FEET New Levee	LINEAR FEET Enlargement
1	Eltringham Contract....	East Baton Rouge, Iberville and St. John.....	Feb. 8, 1894.	Apl. 21, 1894	5,484	18,168
2	Andrews' Contract.....	Iberville, St. James and St. Charles...	Nov. 29, 1893	May 11, 1894	7,356	30,876
3	Hermitage and Bocage.	Ascension.....	Dec. 28, 1893	May 7, 1894..	....	2,717
4	LeBlanc to Canty.....	Ascension..	Dec. 19, 1893	May 4, 1894..	.....	8,185
5	Sport	St. James.....	.....	June 1, 1894..	.....	750
6	Quigley Contract.....	St. John and Jefferson.....	Jan, 6, 1894.	May 3, 1894..	324	36.620
7	Barbour and Rupple Contract.....	St. John	Apl. 26, 1894	Apl. 30, 1894	.....	.....
8	Southport	Jefferson.....	Mar. 8, 1894.	May 17, 1894	.....	2,559
	Totals.....	.. ..	.....	....	13,164	99,875
	Less work done previous to April 20, 1894.....				13,164	99,500
	Work done from April 20, 1894, to April 20, 1896.....				....	375 or 0.07 mls

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

Digitized by Google

No. 5. PONTCHARTRAIN LEVEE DISTRICT.

Pontchartrain Levee District, under one contract, entered into from of earlier date, not completed April 20, 1894.

Cubic Yards	Price—Cents	COST: District Fund	STREAM	REMARKS
99,053	27.50	$27,239 57	Mississippi River.	
243,949	16. to 22.50	46,129 31	Mississippi River.	
2,130	22.	468 60	Mississippi River.	
46,979	22.50	10,570 27	Mississippi River.	
4,286	23. and 35.	1,112 98	Mississippi River.	
158,373	35. to 75.	66,941 75	Mississippi River.	
1,350	35.	472 50	Mississippi River.	
12,575	30.	3,772 50	Mississippi River.	
568,695	.....	$156,707 48	....	
527,368	.....	144,790 60	....	
41,327	.....	$11,916 88	.....	Average price, 28.83 cents per cubic yard.

list of dimensions furnished, and estimates made by the Board of State Engineers for the work, without regard to discount, interest, or other incidental expenses incurred

Digitized by Google

APPENDIX A. STATEMENT

Levee Work undertaken by the Board of Commissioners of the from April 20, 1894, to April 20, 1896, with three

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
1	Truxillo	Assumption	Aug. 6, 1894	Sept. 8, 1894	300	217
2	Verret	Assumption	Aug. 6, 1894	Nov. 15, 1894	2,200	.....
3	Pugh (Woodlawn)	Assumption	Aug. 6, 1894	Nov. 15, 1895	1,362	.....
4	Theriot	Lafourche	Aug. 6, 1894	Jan. 4, 1895	4,645	.....
5	Raceland Raising	Lafourche	Apl. 2, 1894	Mar. 28, 1895	.....	7,465
6	Barrilleaux	Lafourche	Aug. 6, 1894	Mar. 23, 1895	8,947	275
7	Lovincy-Le Blanc Extension	Lafourche	Jan. 2, 1894	Aug. 21, 1894	1,709	.....
8	Rich Bend	St. James	Dec. 17, 1894	Mar. 18, 1895	.....	5,521
9	Section No. 7	St. John	June 5, 1893	July 3, 1894	.....	7,008
10	Bel Crevasse	Jefferson	Jan. 2, 1895	Mar. 4, 1895	.....	1,300
11	Bayou Lafourche contract	.....	July 11, 1895	.....	.....	.....
	Section No. 1	Ascension	.....	.....	1,190	2,380
	Section No. 2	Assumption	.....	.....	3,660	22,400
	Section No. 3	Assumption	.....	.....	8,938	8,549
	Section No. 5	Lafourche	.....	.....	.....	1,991
	Section No. 6	Lafourche	.....	.....	16,669	14,142
	Section No. 7	Lafourche	.....	.....	3,100	3,056
	Totals	.....	.....	.....	52,720	74,324
	Less work done previous to April 20, 1894, and work not completed April 20, 1896				8,684	21,575
	Work done from Apri 120, 1894, to April 20, 1896				44,036 or 8.34 ms	52,749 or 9.99 ms

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

Digitized by Google

No. 6. LAFOURCHE BASIN LEVEE DISTRICT.

Lafourche Basin Levee District, under eight contracts, entered into contracts of earlier date, not completed April 20, 1894.

Cubic Yards	Price—Cents	COST District Fund	STREAM	REMARKS
3,214	9.96	$ 320 11	Bayou Lafourche	
24,773	10.93	2,707 69	Bayou Lafourche	
16,649	11.23	1,869 68	Bayou Lafourche	
82,977	12.	9,957 24	Bayou Lafourche	
31,953	9.73	3,109 02	Bayou Lafourche	
165,547	12.50	20,693 37	Bayou Lafourche	
31,170	15.50	4,831 35	Bayou Lafourche	
18,688	10.22	1,904 80	Mississippi River.....	
39,506	11⅛	4,395 04	Mississippi River.....	
2,904	10.	290 40	Mississippi River.....	
.....	.....	.....	Bayou Lafourche	
27,837	Scale of Prices			
127,268				
147,167				
11,783		63,331 00		
359,014				
78,136				
1,168,536	.....	$113,409 70		
273,772	.....	26,993 00		
894,764	.....	$86,476 70		Average price 9.66 cents per cubic yard.

list of dimensions furnished, and estimates made by the Board of State Engineers, for the work, without regard to discount, interest, or other incidental expenses incurred

Digitized by Google

APPENDIX A. STATEMENT

Levee work undertaken by the Board of Commissioners of the Lake April 20, 1894,

Number	NAME OF CONTRACT	PARISH	DATE OF		Linear Feet—Enlargement
			Contract	Final Certificate	
1	Fairview	Plaquemines	Jan. 18, 1895,	March 1, 1895	1,800 or 0. 35 miles

NOTE—The number of cubic yards given in the foregoing statement is based upon the levee named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

Digitized by Google

No. 7. LAKE BORGNE BASIN LEVEE DISTRICT.

Borgne Basin Levee District, under one contract entered into, from to April 20, 1896.

Cubic Yards	Price—Cents	COST District Fund	STREAM	REMARKS
999	12.50	$124 87	Mississippi River.....	Resolution of Board, January 18, 1895.

list of dimensions furnished, and estimates made by the Board of State Engineers, for the work, without regard to discount, interest, or other incidental expenses incurred

Digitized by Google

APPENDIX A. STATEMENT

Levee work undertaken by the Board of Commissioners of the April 20, 1894 to

Number	NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
			Contract	Final Certificate	New Levee	Enlargement
1	Lower Butler.....	Plaquemines	Oct. 20, 1894	Jan. 17, 1895	993	.....
2	Cyprien Buras.....	Plaquemines	Oct. 20, 1894	Jan. 18, 1895	.....	3,614
3	Section No. 1.....	Plaquemines	Oct. 19, 1895	Jan. 21, 1896	.....	8,600
	Totals.....	.....	.....	.....	993 or0.19mls	12,214 or2.31mls

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

Digitized by Google

No. 8. BURAS LEVEE DISTRICT.

Buras Levee District, under three contracts entered into, from April 20, 1896.

CUBIC YARDS	Price—Cents	COST	STREAM	REMARKS
		District Fund		
3,665	13.50	$ 494 77	Mississippi River ...	
3,804	16.75	637 17	Mississippi River ...	
15,075	15.	2,261 25	Mississippi River ...	
22,544		$ 3,393 19		Average price 15.05 cents per cubic yard.

list of dimensions furnished, and estimates made by the Board of State Engineers. for the work, without regard to discount, interest, or other incidental expenses incurred

Digitized by Google

APPENDIX A.

STATEMENT

Levee work undertaken by the Board of Commissioners of the April 20, 1894, to

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
1	Coushatta Ramp	Caddo		Dec. 23, 1895		
2	Rush Point	Caddo		Nov. 11, 1895	935	
3	Wilderness	Caddo	Aug. 20, 1895	Mar. 10 1896	7,570	1,830
4	Tone's Bayou Ramp	Caddo		Nov. 11, 1895		
5	Long Branch Enlargement	Caddo	Mar. 5, 1895	Mar. 20, 1895		1.056
6	Scott Contract	Caddo	Nov. 20, 1894	Mar. 27, 1895	9,186	18,029
7	Bobbitt, Linnan & Co. Contract	Caddo	Mar. 5, 1895	July 1, 1895	47,435	2,875
	Totals				65,126 or 12.33 mls.	23,790 or 4.50 mls

NOTE—In addition to the work given in the foregoing statement. the Caddo Levee District expended the following amounts, under the following contracts not paid for by the cubic yard:

8	Rush Point Bulkheads	Caddo				
9	Tone's Bayou Bulkheads	Caddo				
10	Coushatta and Dooley Bayou Enlargement					
	Total					

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

Digitized by Google

No. 9. CADDO LEVEE DISTRICT.

Caddo Levee District, under ten contracts entered into, from April 20, 1896.

CUBIC YARDS	Price—Cents	COST District Fund	STREAM	REMARKS
941	10	$ 94 10	Red River ...	
4,646	8	371 68	Red River ...	
88,307	20	20,969 40	Red River ...	
13,282	25			
609	10	60 90	Red River ...	
2,806	10	280 60	Red River ...	
155,571	14 44	22,464 45	Red River ...	Includes work at Eagle Bend, Staten Point, Tone's Bayou, Brown, Cash, Pascagoula, Logie Lea, and Upper and Lower Magnolia.
246,490	12.74	31,402 80	Red River ...	Includes work at Caspiana, Whitehall, Campo Bello, Cross Keys, and Beaird and Bonner.
512,602	.....	75,643 98	.....	Average price 14.76 cents per cubic yard.
.....	.....	480 00	Red River ...	Woodwork to protect angles of levee.
.....	.....	500 00	Red River ...	Woodwork to protect ends of levee.
.....	.....	152 79	Red River ...	Bonus paid to contractor on State work to induce his acceptance of extension.
.....	.....	$ 76,776 72		

list of dimensions furnished and estimates made, by the Board of State Engineers, for the work, without regard to discount, interest, or other incidental expenses incurred

Digitized by Google

APPENDIX A. STATEMENT

Levee work undertaken by the Board of Commissioners of the Bossier to April

Number	NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
			Contract	Final Certificate	New Levee	Enlargement
1	Scopini Enlargement...	Bossier	.....	Dec. 29, 1894	.....	5,200
2	Waterloo to Navigation Point.....	Bossier	Oct. 18, 1894	Apl. 1, 1895	9,984	.....
3	Whitehonse	Bossier	Apl. 18, 1895	June 17, 1895	234	.....
	Totals.....	.....	.....	.....	10,218 or 1.94 mls	5,200 or 0.98 mls

NOTE—In addition to the work given in the foregoing statement, the Bossier Levee District contributed towards the payment of the work done by the State at Hurricane Bluff to Willow Chute, and from Knox Point to Buckhorn, as follows, viz:

	Hurrican Bluff to Willow Chute.....	Bossier	.....	.....	.....	.....
	Knox Point to Buckhorn	Bossier	.....	.....	.....	.....
	Total.....	.....	.....	.....	.....	.....

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

Digitized by Google

No. 10. BOSSIER LEVEE DISTRICT.

Levee District, under three contracts, entered into from April 20, 1894, 20, 1896.

Cubic Yards	Price—Cents	COST District Fund	STREAM	REMARKS
12,032	16	$ 1,925 12	Red River.....	
131,787	14.75	19,438 68	Red River.....	
1,191	9	107 19	Red River.....	
145,010	.....	$21,470 89		Average price 14.81 cents per cubic yard
.....	.....	2,500 00		
.....	.....	17,500 00		
....	.....	$41,470 89		

list of dimensions furnished, and estimates made by the Board of State Engineers, for the work, without regard to discount, interest, or other incidental expenses incurred

Digitized by Google

APPENDIX A. STATEMENT No. 11. RED RIVER,

Levee work done by the Board of Commissioners of the Red River, entered into from April 20, 1894, to April 20, 1896,

Number	NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
			Contract	Final Certificate	New Levee	Enlargement
1	Hudson	Rapides	Oct. 5, 1893	May 3, 1894	7,275	.....
2	Bordelonville	Avoyelles	Nov. 12, 1895	Apl. 18, 1896	.....	8,885
3	Mill Bayou Canal	Avoyelles	Oct. 5, 1893	Jan. 22, 1895	.....	.....
4	Yellow Bayou to Simmsport	Avoyelles	 1896	.....	.....	15,090
5	Delana	St. Landry	.....	May 3, 1894	4,061	1,842
6	Bayou Rouge to Melville	St. Landry	.....	Apl. 15, 1896	1,121	13,449
	Totals	.....	.....	.....	12,477	39,266
	Less work done previous to April 20, 1894, and work not completed April 20, 1896	.....	.....	.....	11,356	16,932
	Work done from April 20, 1894, to April 20, 1896	.....	.....	.....	1,121 or 0.21 mls.	22,334 or 4.21 mls.

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

Digitized by Google

ATCHAFALAYA AND BAYOU BŒUF LEVEE DISTRICT.

Atchafalaya and Bayou Bœuf Levee District, under three contracts, with three of earlier date, not completed April 20, 1894.

Cubic Yards	Price--Cents	COST District Fund	STREAM	REMARKS
124,420	14.	$17,418 80	Red River.....	
29,324	12.90	3,782 80	Bayou des Glaizes	
11,673	20.	2,334 60	Bayou des Glaizes	
100,000	14.45	14,450 00	Bayou des Glaizes	
35,046	14.	4,906 44	Atchafalaya Riv...	
51,280	12.	6,153 60	Atchafalaya Riv...	
351,743	.....	$49,046 24		
265,046		38,096 44		
86,697		$10,949 80		Average price 12.64 cents per cubic yard.

list of dimensions furnished and estimates made by the Board of State Engineers, for the work, without regard to discount, interest, or other incidental expenses incurred

Digitized by Google

APPENDIX A. STATEMENT

The Board of State Engineers is indebted to the courtesy of Captain C. statement of "levees built and enlarged by the United

NAME OF CONTRACT	County.	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
On Arkansas River—					
Arkansas River, Sections 1, 2, 3 and 4	Desha	Mar. 4, 1894	July 17, 1895	18,800	
Arkansas River, Section 5	Desha	Feb. 8, 1894	Jan. 31, 1896	5,200	
Arkansas River, Section 6	Desha	Mar. 8, 1894	Dec. 26, 1895	5,000	
Arkansas River, Section 7	Desha	Mar. 8, 1894	Jan. 14, 1896	5,000	
Arkansas River, Section 8	Desha	Mar. 8, 1894	Oct. 5, 1895	4,800	
Arkansas River, Section 9	Desha	Mar. 8, 1894	Aug. 6, 1895	8,700	
Red Fork Extension, Section 10	Desha	June 11, 1895	Nov. 5, 1895	4,500	
Red Fork Extension, Section 11	Desha	June 7, 1895	Dec. 31, 1895	4,500	
Red Fork Extension, Section 12	Desha	June 7, 1895	Dec. 31, 1895	5,465	
Red Fork Extension, Section 13	Desha	June 7, 1895	Oct. 7, 1895	3,500	
Below Amos Bayou—					
Boggy Bayou to Gaines' Landing, 1304 to 1369	Chicot	Jan. 30, 1894	Aug. 7, 1894		6,500
Boggy Bayou to Gaines' Landing, 1369 to 1445	Chicot	Feb. 8, 1894	Sept. 17, 1894		7,600
Boggy Bayou to Gaines' Landing, 1446 to 1510+70	Chicot	Feb. 8, 1894	Oct. 8, 1894		6,470
Panther Forest, 0 to 27	Chicot	Mar. 8, 1894	May 2, 1895	2,700	
Panther Forest, 27 to 54	Chicot	Mar. 8, 1894	May 2, 1895	2,700	
Panther Forest, 54 to 96	Chicot	Feb. 8, 1894	Mar. 15, 1895	4,190	
Sterling to Louisiana Line, 1038 to 1140	Chicot	Feb. 8, 1894	Sept. 7, 1894	8,400	
Sterling to Louisiana Line, 1140 to 1212	Chicot	Feb. 8, 1894	Apl. 2, 1895	6,748	
Opossum Fork, 317 to 335	Chicot	Feb. 8, 1894	Apl. 2, 1896	1,873	
Matthew's Bend, 0 to 30	Chicot	May 15, 1894	Jan. 4, 1895	2,998	
Matthew's Bend, 30 to 73	Chicot	May 31, 1894	Apl. 9, 1895	4,300	
Matthew's Bend, 73 to 115	Chicot	May 15, 1894	Dec. 26, 1894	4,200	
Matthew's Bend, 115 to 162	Chicot	May 15, 1894	Oct. 5, 1894	5,526	
Lucca Loop, 420 to 468	Desha	Nov. 6, 1894	Mar. 25, 1895		4,725
Vancluse, 388 to 421	Chicot	Nov. 6, 1894	May 4, 1895	3,465	
Below Sunnyside, 685 to 791	Chicot	Nov. 6, 1894	May 8, 1895	6,244	
Gorman Ridge, upper	Chicot	Nov. 6, 1894	July 11, 1895	17,900	
Gorman Ridge, lower	Chicot	Nov. 6, 1894	Mar. 27, 1896	10,030	
Cypress Creek, 222 to 274	Desha	Nov. 6, 1894	Mar. 2, 1896	5,200	
Grand Lake	Chicot	Nov. 6, 1894	Apl. 27, 1895		8,880
Cypress Creek, 275 to 322	Desha	Nov. 6, 1894		4,800	
At Mounds', on Cypress Creek, 0 to 51	Desha	Dec. 19, 1894	Apl. 2, 1896	5,100	
At Mounds', on Cypress Creek, 51 to 98 plus 15	Desha	Jan. 10, 1895	Apl. 4, 1896	4,715	
Cypress Creek Line, 0 to 35 and 44 to 67	Desha	June 7, 1895	Feb. 8, 1896	6,672	
Lucca Extension, 483 plus 55 to 630 plus 70	Desha	June 7, 1895	Mar. 2, 1896		14,715
Chicot, 660 to 785	Desha	June 7, 895	Aug. 26, 1895		11,814
Above Luna 1904 to 1914	Chicot	June 7, 1895	July 30, 1895		4,150
Leland, 77 to 216	Chicot	June 7, 1895	Jan. 6, 1896		13,857
Lakeport, 889 to 1003	Chicot	June 7, 1895	Nov. 1, 1895		11,400

Digitized by Google

No. 12. UNITED STATES LEVEES

McD. Townsend, Corps of Engineers, U. S. Army, for the following States in the Upper Tensas Basin Levee District."

Cubic Feet	Price—Cents	Cost	REMARKS
251,151	7.¾	$19,464 20	
74,606	9.20-100	6,863 76	
71,078	9.48-100	6,738 20	
62,724	9¾.	6,115 60	
77,054	10.½	8,090 67	
98,712	9.	8,884 08	
45,940	9.45-100	4,341 33	
51,623	9.45-100	4,878 37	
60,976	9.45-100	5,762 23	
45,620	10.⅛	4,619 02	
109,200	9.½	10,374 00	
112,704	8.74-100	9,850 32	
128,974	10.½	13,542 26	
178,646	19.¾	34,295 08	
159,554	17.85-100	28,480 36	
93,649	10.¾	10,067 26	
89,274	9.¾	8,704 21	
88,894	11.¾	10,445 05	
64,498	16.	10,319 68	
139,774	16.¼	22,713 28	
152,271	14.	21,317 94	
101,819	9.98-100	10,161 63	
179,609	11.99-100	21,535 12	
46,055	10.½	4,835 77	
56,781	9.	5,110 29	
82,807	8.15-100	6,768 77	
297,577	8.99-100	27,231 65	$479.48 expended for protection levee included,
281,809	10.99-100	30,980 67	
131,049	12.93-100	16 944 61	
79,963	11.98-100	9,581 96	
107,535	13.	12,581 60	Ret'd perc. $1,397.94; estimated cubic yards, 155,568.
118.614	11.88-100	14,091 32	
111,704	11.73-100	13,102 85	
78,572	10.¾	8,151 84	
50,394	13.½	6.795 09	
72,663	10.1-5	7,411 62	
30.271	10.9-10	3,299 54	
122,181	6.9-10	8,430 49	
30.286	7.70-100	2,382 02	

Digitized by Google

STATEMENT

NAME OF CONTRACT	County	DATE OF		LINEAR FEET	
		Contract	Final Certificate	New Levee	Enlargement
Below Amos Bayou—Continued					
Florence to Brook's Mill, 1224 to 1237, 1317 to 1333 and 1356 to 1374	Chicot	June 7, 1895	Oct. 25, 1895		7,680
Sunnyside	Chicot	July 8, 1895			22,352
Florence Banquette	Chicot	Nov. 2, 1895	Nov. 14, 1895		2,819
Sunnyside	Chicot	Nov. 2, 1895	Jan. 2, 1896		3,000
Totals				173,226	125,962

Digitized by Google

No. 12—Continued.

Cubic Yards	Price—Cents	Cost	REMARKS
10,426	6.3/4	$ 664 66	
90,524	8.4-8	7,608 80	Ret'd perc. $767.63; estimated cubic yards, 93,664.
1,212	6.3/4	77 27	
7,342	8.4-8	622 60	
4,241,165	.....	$478,187 07	

Digitized by Google

APPENDIX A. STATEMENT

The Board of State Engineers is indebted to the courtesy of Captain C. statement of " levees built and enlarged by the

NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
		Contract	Final Certificate	New Levee	Enlargement
Upper Reids'	Madison	March 8, 1894	July 1, 1895	6,900	
Lower Reids'	Madison	Feb. 8, 1894	Dec. 31, 1895	9,735	
O'possum Point, 755 to 851	East Carroll	Dec. 19, 1894	April 13, 1895		9,512
Lake Providence	East Carroll	Dec. 19, 1894	March 1, 1895		12,286
Otter Bayou to Point Lookout, 1840 to 1986	East Carroll	Dec. 19, 1894	March 1, 1895		14,527
Wilton to Salem, 2287 to 2528	East Carroll	Dec. 19, 1895	March 1, 1895		24,331
Louisiana Bend, 0 to 190	East Carroll	July 8, 1895			19,000
Bunche's Bend, 255 to 755	East Carroll	July 8, 1895			49,910
Wilson's Point, 850 to 1119	East Carroll	July 8, 1895	Sept. 21, 1895		7,957
Donna Vista, 1119 to 1190	East Carroll	July 8, 1895	March 2, 1896		7,100
Benham to Elton, 1190 to 1,458 plus 47	East Carroll	July 8, 1895			26,847
Lake Providence to Deesona, 1502 to 1674	East Carroll	July 8, 1895	Jan. 3, 1896		17,110
Concord to Homestead, 1995 to 2090	East Carroll	July 8, 1895	Feb. 3, 1896		10,475
Atherton to Stamboul, 2090 to 2263 plus 70	East Carroll	July 8, 1895			17,870
Upper Willow, 2263 to 2411	East Carroll	July 8, 1895			14,720
Pecan Grove, 2617 to 2748	East Carroll	July 8, 1895	Dec. 2, 1895		13,070
Henderson, 2748 plus 25 to 3077 plus 20	East Carroll	July 8, 1895	Jan. 3, 1896		32,895
Buckhorn, Upper Section, 3118 to 3261	Madison	July 8, 1895			11,390
Buckhorn, Lower Section, 3,261 to 3295 plus 10	Madison	July 22, 1895	Dec. 6, 1895		3,410
Millikin's Bend, 3295 to 3390 plus 20	Madison	July 22, 1895	Dec. 6, 1895		9,520
Delta, 4176 to 4325	Madison	July 8, 1895			14,725
O'Brien, 4320 to 4410	Madison	July 8, 1895		18,660	
Totals				35,295	316,155

Digitized by Google

No. 13. UNITED STATES LEVEES.

McD. Townsend, Corps of Engineers U. S. Army, for the following United States in the Middle Tensas Levee District."

Cubic Yards	Price—Cents	Cost	REMARKS
384.574.3	16.21	$62,339 45	
285,016.7	14.	32,186 78	$7,715.54 still due.
41,829.5	11.	4,601 24	
38,265.2	11.	4,209 17	
70,800.1	10.90	7,717 20	
86,286.6	9.	7,765 79	
25,572.6	9.½	2,186 46	Ret'd perc. $242.93. Estimated cubic yards, 39,917.4.
56,554.3	9.¾	4,962 54	Ret'd perc. $551.39. Estimated cubic yards, 175,095.7.
23,881.1	7.4	1,767 19	
58,943.7	8.24	4,856 96	
53,774.4	8.70	4,210 54	Ret'd perc. $467.81. Estimated cubic yards, 73,066.7.
24,730.5	9.91	2,450 78	
34,071.2	8.7	2,964 17	
65,089.5	9.91	5,805 33	Ret'd perc. $645.02. Estimated cubic yards, 76,250.2.
33,793.7	14.	4,258 01	Ret'd perc. $473.09. Estimated cubic yards, 45,061.1.
48,986.7	12.91	6,324 18	
48,990.6	7.64	3,742 86	
67,944.0	11.91	7,282 92	Ret'd perc. $809.19. Estimated cubic yards, 84,017.5.
25,115.5	8.45	2,122 25	
33,700.2	8.93	3,009 42	
13,172.1	8.17	968 55	Ret'd perc. $107.70. Estimated cubic yards, 16,684.1.
52,865.7	7½	4,995 81	Ret'd perc $555.06. Estimated cubic yards, 62,626.1.
1,573,958.2	.....	$180,727 70	

Compliments of

Board of State Engineers.

Digitized by Google

STATEMENT No. 14.

APPENDIX A. UNITED STATES LEVEES.

The Board of State Engineers is indebted to the courtesy of Capt. George McC. Derby for the following Statement of "Levees built and enlarged by the United States in the Fourth District, Improving Mississippi River, from opposite Warrenton, Miss., to Head of Passes from April 20, 1894, to April 20, 1896."

NAME OF LEVEE	MILES—B. C.	DATE OF COMPLETION	LENGTH IN LINEAR FEET		TOTAL YARDAGE
			New Levee	Enlargement	
Lower Tensas District. 1894-1895.					
Hard Times—Wilson	631	Feb. 7, 1895		3,900	27,818.98
Hard Times	632	Jan. 1, 1895		3,983	25,449.74
Kempe, Upper	657	Mar. 27, 1895		4,600	60,218.79
Kempe, Lower	659	Mar. 31, 1895		15,090	50,916.25
Deer Park	721	Oct. 31, 1894		4,231	17,958.25
Forest Home	722	Mar. 5, 1895	6,420		94,267.54
Fish Pond Gap	723	Feb. 25, 1895	65		623.00
Ashley	723	Feb. 8, 1895	1,690	7,526	37,792.40
1895-1896.					
Kempe, Middle	658	Nov. 19, 1895		7,500	51,371.83
Hard Times—Wilson					
Section 1 to 5	632			21,100	91,942.34*
Section 6 to 10	632	Nov. 19, 1895		11,022	90,160.06
Arnauldia to Moro	705		4,965	39,128	150,908.21*
Palo Alto	699		8,632		30,641.43*
Atchafalaya District. 1894-1895.					
Smithland	787	Nov. 19, 1894	1,257		19,695.45
Lakeland	799	Jan. 21, 1894	1,100		16,635.49
Nina	806	Mar. 29, 1895		5,680	20,305.45
Hermitage Dyke	808	Mar. 28, 1895		3,385	9,189.37
Anchorage No. 1	831	Feb. 20, 1895	2,974		49,499.70
Anchorage No. 2	831	Mar. 22, 1895		1,168	9,137.03
Cinclare, Upper	838	Mar. 27, 1895	633	2,620	22,250.60
Cinclare, Lower	838	Mar. 28, 1895	205	2,595	21,790.06
Cohn	838	Apl. 5, 1895	1,304		27,873.44
Brusley Upper	839	Apl. 7, 1895		2,757	20,674.56
Brusley Lower	839	Apl. 11, 1895		3,100	24,714.30
Uhry	841	Feb. 19, 1895	485		8,137.28
St. Delphine	841	Mar. 31, 1895		2,497	22,460.70
Eliza	842	Apl. 3, 1895		1,769	14,611.09
Robertson	853	Mar. 26, 1895	623	935	14,334.17
St. Louis	856	Feb. 25, 1895	5,773		112,557.41
Evergreen	856	Nov. 14, 1894		1,059	8,522.04
Olivia	858	Dec. 14, 1894		6,800	28,607.12
Arcadia	859	Feb. 28, 1895		3,974	21,073.50
Solouque	860	Dec. 1, 1894		2,803	10,933.59
Last Hope	860	Nov. 3, 1894	1,192		13,507.85
Golden Ridge	861	Mar. 18, 1895	1,100	1,280	19,770.57
Point Pleasant	862	Feb. 10, 1895	1,296	1,072	18,424.21

Digitized by Google

STATEMENT No. 14—Continued.

NAME OF LEVEE	MILES—B. C.	DATE OF COMPLETION	LENGTH IN LINEAR FEET		TOTAL YARDAGE
			New Levee	Enlargement	
Atchafalaya District—Continued 1894-1895.					
St. Raphael	862	Feb. 24, 1895		5,300	23,767.86
Beatty	863	Dec. 2, 1894	1,106		13,131.14
Palo Alto	864	Dec. 13, 1894		4,042	20,221.07
Dunboyne	865	Nov. 9, 1894		435	1,468.35
Eimer	866	Dec. 7, 1894	2,110		34,650.44
Eimer Lower	866	Mar. 6, 1895	682	778	9,917.17
Rice	866	Dec. 1, 1894		1,050	6,621.99
Nodaway	868	Feb. 6, 1895		7,021	38,226.68
Dorceyville	868	Nov. 23, 1894	1,630		8,479.18
Whitecastle	868	Dec. 8, 1894	950		22,517.17
Cora	870	Mar. 29, 1895		3,780	27,979.28
Belle Grove	871	Jan. 21, 1895	2,993		51,179.29
Old Hickory No. 1	873	July 14, 1894	2,900		30,828.03
Old Hickory No. 2	873	Nov. 23, 1894	931		10,229.20
Claiborne	875	Mar. 12, 1895	24,968		98,110.13
Elise	877	Jan. 27, 1895	2,551		28,909.55
Modeste	878	Dec. 24, 1894		1,617	12,856.16
Babin	879	Jan. 27, 1895	1,899		22,257.54
Landry	879	Jan. 11, 1895	211	1,582	5,926.52
Smoke Bend	884	Jan. 31, 1895	2,106		34,409.80
1895-1896.					
Ennis to Smithland	769			21,070	106,826.94*
Stonewall	793			4,127	13,450.04*
Alaska to Lakeland	803			26,797	173,539.09*
St. Claude	806			3,800	30,548.36*
Highland to Wildwood, Sections 4, 5, 6 and 7	814			11,969	83,723.96*
Barroza to Highland	820			29,476	199,291.38*
Belle Vale to Allendale	825			6,738	60,632.88*
Viola to Belmont	827			6,777	80,738.68*
Oaks	833	Dec. 12, 1895	1,200		32,402.84
St. Michael	833	Nov. 19, 1895	1,112		32,273.62
Eliza	842	Dec. 4, 1895		2,610	14,195.86
Nereaux, Lower to Medora Upper	852	Dec. 4, 1895	5,381		149,828.67
Mayflower	854	Oct. 12, 1895		4,738	24,222.58
Fortville	855	Oct. 29, 1895		3,330	14,233.52
Smoke Bend	883.5			949	13,840.99*
Evan Hall	885			4,189	2,215.21*
Lafourche District. 1894-1895.					
Saulsburg	894	Jan. 18, 1895	3,970		44,705.20
Lauderdale	895	Nov. 17, 1894		3,100	10,632.77
Ferchaud	896	Dec. 12, 1894	1,391		16,253.90
Pike's Peak	905	Dec. 13, 1894		1,255	9,277.12
Laura	911	Jan. 24, 1895		1,911	7,707.47
Willow Grove	916	Jan. 15, 1895	1,873		20,263.38
Stevenson	918	Feb. 25, 1895	1,491		24,814.02
Songy	924	Jan. 3, 1895	3,972		59,844.84
Star	932	Dec. 24, 1894	1,300		19,869.77
Madere	937	Jan. 18, 1895	1,267		9,997.69
Alice Upper	945	Dec. 8, 1894		1,495	4,003.86

Digitized by Google

STATEMENT No. 14—Continued.

NAME OF LEVEE	MILES—B.C.	DATE OF COMPLETION	LENGTH IN LINEAR FEET		TOTAL YARDAGE
			New Levee	Enlargement	
Lafourche District—Continued. 1894-1895.					
Fortier	946	Jan. 6, 1895..	1,100		10.237.29
Soniat	947	Jan. 29, 1895..		4,565	19,156.72
Odier	948	Dec. 8, 1894.	2,708		8,499.44
Willswood	951	Feb. 25, 1895.	1,250	6,552	42,304.49
Starlight	953	Mar. 8, 1895..	3,031		69,649.99
1895-1896.					
Winchester	897	Jan. 17, 1896..		6,687	30,782.56*
Welcome	898			7.047	33,456.14*
Barton	899	July 8, 1895..	1,037	1,128	14,499.82
St. Claire	900	Dec. 6, 1895..		6,207	25,470.46
St. Cecile	901	Dec. 15, 1895..		6,219	26.075.60
St. James' Church	902			5,900	25.876.27*
St. James Estate	902			4,232	17,528.85*
Bonsecour	903	Aug. 15, 1895..		5,494	22,136.96
Rich Bend to Bonsecour to Poor Devil	904-15			30,271	141,721.05*
Poor Devil	915	Aug. 8, 1895..	6,099		18,419.71
Willow Grove	917	Dec. 24, 1895..		7,852	30,653.80
Carroll	918	Mar. 5, 1895..		5.756	28,172.69
Maxie	921	Dec. 5, 1895..		5,800	26,549.05
Columbia	922	Nov. 12, 1895.	1,745	1,558	26,356.52
Le Bœuf	922	Nov. 19, 1895.	1,848	1.821	25,534.00
Hymelia to Songy	927			29,228	121,040.11*
Star No. 1	934			3,900	16,785.07*
Star No. 2	934			2,725	16,253.04*
Fashion	937	July 18, 1895..	3,678		35,073.60
Davis to Lone Star—					
Section No. 1	944	Feb. 17, 1896..		2,917	19,921.99
Section No. 2	944			3,655	22,975.79*
Witherow	953	Jan. 17, 1896..		406	2,287.81
Starlight	954	Feb. 6, 1896..		2,771	16,808.68
Waggaman	654	Jan 17, 1896..		3,245	20,632.03
Columbia Garden—					
Section No. 2	959			6,868	28,355.68*
Pontchartrain District. 1894-1895.					
Gourrier	827	Mar. 26, 1895..	2,900		74.260.66
Revenue	874	Sept. 13. 1894..	2,424		47.003.34
Darrowville	886	Jan. 19, 1895..	2,635		32.285.11
St. Mary's Chapel	894	Mar. 3, 1895..	436	2,525	28,824.34
Jacob	901	Nov. 13, 1894..	2,339		26,175.56
Convent	903	July 24, 1894..	5,665		45.584.15
Belmont	907	Jan. 19, 1895..	3,151		65 547.59
Venus	909	Aug. 25, 1894..	948		18,115.50
David	914	Feb. 19, 1895..	2,584	327	33,002.90
Old Church	914	Nov. 26, 1894..	718		8,508.55
Golden Grove	914	Apl. 13, 1895..		4.753	37,654.58
Sport	915	Mar. 16, 1895..	1,144		17,080.56
Hope, Lower	917	Sept. 13, 1894..	1,700		18,465.01
Belle Point	924	Sept. 22, 1894..	2,020	6,030	43,505.64
Rost	940	Sept. 22, 1894..	4,396		43,768.82
Modoc No. 1	940	July 25, 1894..	949		11,945.97

Digitized by Google

STATEMENT—No. 14—Continued.

NAME OF LEVEE	MILES—B. C.	DATE OF COMPLETION	LENGTH IN LINEAR FEET		TOTAL YARDAGE
			New Levee	Enlargement	
Ponchartrain District—Cont'd. 1894-1895.					
Modoc No. 2	940	Mar. 4, 1895		1,643	10,898.10
Frellsen No. 1	945	Aug. 28. 1894	900		20,426.31
Frellsen No. 2	945	Nov. 30, 1894	1,342		31,218.39
Kenner	947	Feb. 10, 1895	1,948	274	36,489.40
1895-1896.					
Cartness	836			3,214	12,419.54*
Martinez-Sharps	843	July 26, 1895	8,012		22,521.69
Shannon	837	Jan. 18, 1896		5,495	18,089.83
Hollywood	843	Dec. 27, 1895		3,718	21,870.14
Chatsworth	847	Aug. 15, 1895		3,172	23,185.54
Longwood	847	Aug. 15, 1895		3,787	22,396.18
Woodstock	848			7,740	28,654.46*
Granada	850			7,700	21,665.61*
Hermitage	851	Aug. 31, 1895		4,827	20,792.38
Mount Olive	856	Aug. 18, 1895	7,364		23,094.76
Magnolia	859	Sept. 25, 1895	3,390		14,780.50
Dupuy	863	Mar. 12. 1896		4,638	10,704.90
Thiery	864	Aug. 15, 1895	782	1,347	27,248.85
Jolly	865	Aug. 24, 1895	1,962		23,373.87
Leper Home	870	Sept. 6, 1895	1,705	3,005	28,177.34
Indian Camp	871	Sept. 6, 1895	1,682	1,488	27,060.31
Southwood	874			4.001	21,006.45*
Dreyfus	874	Feb. 25, 1896		1,033	5,561.53
Waterloo	875	Dec. 19, 1895	4,298		22,682.43
Mount Houmas	875	Nov. 30, 1895	5,000		22,339.23
Linwood	877			660	3,941.49*
Belle Helene	878	Mar. 1, 1896		2,400	9,087.11
Landry	880	Feb. 12. 1896		2,880	14,703.21
Le Blanc	884			1,507	7,721.24*
Jamson	885	Jan. 3, 1896		3,535	10,880.18
Monroe	892	Feb. 22, 1896		6,288	21,500.82
Dicharry	882			1,724	14,619.83
St. Mary's Chapel to Whitehall	896	Oct. 7, 1895		4,848	23,061.63
Alta Villa	896	Oct. 19. 1895		4,955	25,185.46
Rapidan	897	Oct. 18, 1895		5,300	25,006.66
Raum	898	Oct. 21, 1895		2,140	7,750.82
Celestine	899	Oct. 21, 1895		1,912	8,304.36
Nita	899	Oct. 21. 1895		5,092	21,387.41
Uncle Sam	901	Oct. 16. 1895		740	3.240.73
Rassat	903	Oct. 15, 1895		1,500	5,722.72
Lutcher	913	Aug. 20, 1895	1,315	3,073	28.511.79
St. Joseph's Church	913	Nov. 10. 1895	965	5,035	28,372.02
Waguespack	915	Oct. 12, 1895	855	1,703	17.828.84
Mount Airy, Chenet and Angelina	917	Oct. 29, 1895	4,327		84 057.44
Bloomfield	917	Jan. 9, 1896	1,300		28,589.62
Glencoe	920	Aug. 20, 1895	2,357	1,707	25,838 39
San Francisco	920	July 29, 1895	2,198		24,679.07
Anchor	929			6,265	30,859.51*
Keler	930	Jan. 7, 1896		7,000	31,791.61
Hermitage	931	Aug. 31, 1895		5,500	33,505.60
Diamond	932	Oct. 19, 1895		5,500	32,209.18
Red Church	938	Oct. 25, 1895		7,100	25,503.82
Pecan Grove, Upper	942	Feb. 26, 1896		700	1,708.45

Digitized by Google

STATEMENT No. 14—Continued.

NAME OF LEVEE	MILES—B. C.	DATE OF COMPLETION	LENGTH IN LINEAR FEET		TOTAL YARDAGE
			New Levee	Enlargement	
Ponchartrain District—Cont'd. 1895-1896.					
St. Rose	943	Feb. 7, 1896		7,228	28,855.44
Kenner	948	Oct. 30, 1895		3,918	20,622.16
Soniat	953	Mar. 3, 1896		2,833	7,547.01
University	954	Mar. 12, 1896		2,567	7,103.95
Elmwood	955	Mar. 3, 1896		8,200	29,342.65
Barataria District. 1894-1895.					
Getzinger	960	Nov. 27, 1894	1,116		18,936.36
Bell	960	Dec. 24, 1894	2,962		36,592.67
Browns	961	Jan. 3, 1895	895		7,416.67
Kearney, Upper	982	Feb. 25, 1895	1,240		12,496.22
Kearney, Lower	983	Dec. 15, 1894	1,081		8,602 42
Concession	985	Mar. 9, 1895	2,069		18,669.74
Concord, Upper	986	Jan. 31, 1895	1,300		12,058.76
Concord, Lower	987	Jan. 31, 1895	1,988		22,726.73
Cedar Grove	989	Jan. 19, 1895	5,135		28,733.96
Sarah	991	Dec. 15, 1894	3,578		25,427.49
Live Oak Extension	992	Sept. 19, 1894	1,021		7,414.63
La Reussite	996	Jan. 31, 1895	1,307		4,983.84
La Rose	1003	Feb. 4, 1895	1,319	565	7,881.57
Hermitage	1005	Jan. 6, 1895	514		2,638.56
Woodland	1009	Mar. 6, 1895	1,463		9,312.97
Riceland	1015	Jan. 14, 1895	1,526		10,503.98
1895-1896.					
St. Ann	984	Jan. 17, 1896		2,804	6,649.55
Concession	985	Jan. 17, 1896	1,380	506	17,748.64
Oak Point	987	Feb. 16, 1896		3,717	10,826.70
Live Oak	991	Mar. 7, 1896		3,540	6,942.65
Dobard	992	Feb. 16, 1896	410	5,770	16,018.88
Happy Point	993	Feb. 16, 1896		3,360	6,401.12
Turcan	995	Jan. 6, 1896		2,396	7,168.08
Alliance	997	Jan. 6, 1896		7,989	16,263.27
Star	994		2,160	2,035	18,282.55*
Ironton to Myrtle Grove	1000	Feb. 8, 1896		3,134	7,598.86
Myrtle Grove to Wood Park	1001	Feb. 3, 1896		6,757	11,552.97
Wood Park to Deer Range	1003			6,264	14,094.59*
Deer Range to Junior	1005			5,615	11,325.47*
Junior to Point Celeste	1006	Feb. 6, 1896		7,872	11,251.15
Point Celeste to Woodland	1008			12,900	28,378.79*
Diamond	1010		679	1,513	7,458.71*
Magnolia	1012	Mar. 6, 1896		6,955	3,822.85
Barthelemy to Riceland	1015		813	9,225	24,022.34*
Fort Jackson, Upper	1039	Mar. 16, 1896	1,033	3,608	19,513.88
Fort Jackson, Lower	1040	Mar. 16, 1896	660	3,799	15,304.32
Lake Borgne District. 1894-1895.					
Sugar House	970	Sept. 8, 1894	1,280		7,424.28
Violet	975	Dec. 15, 1894	720		4,607.74
Merrtit	976	Dec. 15, 1894	4,214		41,688.21
Caernarvon, Upper	978	Jan. 3. 1895	1,445		23,195.50

Digitized by Google

STATEMENT No. 14—Continued.

NAME OF LEVEE	MILES—B. C.	DATE OF COMPLETION	LENGTH IN LINEAR FEET		TOTAL YARDAGE
			New Levee	Enlargement	
Lake Borgne District—Cont'd. 1894-1895.					
Stella, Upper	985	Oct. 22, 1894..	920		1,905.29
Stella	986	Sept.18, 1894..	3,458		12,264.40
Linwood	988	Feb. 21, 1895..		724	1,758.22
Greenwood	990	Oct. 13, 1894..	4,968		44,738.47
Fanny	993	Dec. 8, 1894..	2,992		18,449.24
Fairview, Upper	996	Jan. 26, 1895..	2,335		18,957.74
Fairview	997	Jan. 27, 1895..	1,786		13,431.02
Fairview, Lower	997	Jan. 26, 1895..		2,182	6,151.66
Burbridge	998	Jan. 18, 1895..		1,324	4,240.07
Monsecour	999	Jan. 27, 1895..	2,860		28,157.81
Davis	1009	Jan. 13, 1895..	1,000		5,639.51
Fort St. Philip	1039	Mar. 28, 1895..		3,700	5,764.08
1895-1896.					
Slaughter House Extension	968			2,194	5,170.93*
Brou	970	Sept. 28, 1895	555	1,332	8,817.28
Poydras, Upper	977	Nov. 16, 1895..	1,918	1,100	24,514.15
Poydras, Middle	977	Dec. 9, 1895..	2,300		22,805.44
Poydras, Lower	977	Nov. 30, 1895..	1,281		25,594.04
Scarsdale	984	Sept. 7, 1895..	402		4,013.52
Stella	986	Feb. 14, 1896..		4,412	7,207.98
Corinne to Mary	971-987		560	33,065	100,200.00*
Promised Land	988	Feb. 26, 1896..		3,529	10,754.16
Linwood to Greenwood	989	Oct. 5, 1896..	1,567		17,799.41
Bertrandville	991			6,715	13,938.71*
Fanny	993			6,796	15,203.25*
Fairview	996			3,061	26,046.60*
Bonsejour	997	Feb. 15, 1896..	2,200		4,278.82
Monsecour	999			7,814	16,652.29
Poverty Point	1000	Feb. 8, 1896..		5,580	5,710.17
Harlem	1003				5,100.00

*NOTE—The levees on which the date of completion is omitted have not as yet been completed and the yardage is estimated.

Digitized by Google

APPENDIX A. STATEMENT

The Board of State Engineers is indebted to the courtesy of Major J. H. of Levee Work on Red River done by the United States,

NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
		Contract	Final Certificate	New Levee	Enlargement
Scopini to Ash Point..... (John Scott & Sons, Contractors.)	Bossier...	Nov. 10, 1894	Feb. 27, 1895	13,497	.....
(W. V. Robson)	Bossier...	....	.....	... ...	.....
Coushatta and Hervey Canal—					
Elmer Bayou Section.. ..... (Michael Hunt, Contractor.)	Caddo	July 25, 1895	Feb. 13, 1896	.....	24,198
Red Bayou Section..... (William J. Bentley, Contractor.)	Caddo	July 25, 1895	Feb. 15, 1896	13,731	....
Red Bayou Dike revetment.....	Caddo.....	....	.....	....	.....
Red Bayou, bulkheads.....	Caddo.....	.....	.....	....	..... .
Tones Bayou, bulkheads..	Caddo..	.....	.....	....	.....
			Total	27,228	24,198

UNITED STATES ENGINEERS' OFFICE, Vicksburg, Miss., April 4, 1896.

Digitized by Google

No. 15. UNITED STATES LEVEES.

Willard, Corps of Engineers, U. S. Army, for the following statement under his direction, from April 1, 1894, to March 31, 1896.

Cubic Yards	Price—Cents	COST	Per Cent. of Work Done.	STREAM	REMARKS
261,455.4-10	14.39-100	$37,623 44	100	Red River....	
....	....	400 00	100	Red River....	Cutting old levee in front of new line; filling wash-outs, and redressing and sodding portions of new line where grass had been killedby excessive cold weather.
70,393.8-10	13.½	9,508 17	100	Red River....	
284,326.7-10	13.89-100	39,492 99	100	Red River....	
....	.....	77 00	100	Red River....	Strengthening rear slope of dike on account of sloughing and caving of banks of Red .Bayou.
....	.....	624 00	100	Red River....	Work done by crew of United States Snag-boat C. W. Howell.
....	.....	500 00	50	....	Work done by crew of United States Snag-boat C. W. Howell. Cost estimated.
616,175.9-10	.....	$88,220 60	.....		

Digitized by Google

APPENDIX A. STATEMENT

Approximate quantity and cost of Levee Work in the several Levee from April 20, 1894, to April 20, 1896, by the Districts, State

LOCALITY	BY WHOM DONE	MILES OF	
		New Levee	Enlargement
Arkansas—			
Desha and Chicot Counties	Tensas Basin Levee District	.....	.....
	United States	32.90	23.85
	Totals	32.90	23.85
Louisiana—			
Fifth Louisiana Levee District	District	.....	40.00
	State	0.17	20.52
	United States	10.80	82.24
	Totals	10.97	142.76
Atchafalaya Basin Levee District	District	17.90	27.70
	State	4.36	2.47
	United States	13.40	20.80
	Totals	35.66	50.97
Pontchartrain Levee District	District	.....	0.07
	State	0.10	8.00
	United States	16.23	27.66
	Totals	16.33	35.73
Lafourche Basin Levee District	District	8.34	9.99
	State	3.31	0.95
	United States	13.32	33.54
	Totals	24.97	44.48
Orleans Levee District	.....	11.67	13.14
Lake Borgne Basin Levee District	District	.....	0.35
	State	0.56	6.07
	United States	6.81	7.23
	Totals	7.37	13.65
Buras Levee District	District	0.19	2.31
	State	1.18	2.11
	United States	0.32	1.40
	Totals	1.69	5.82

Digitized by Google

No. 16. SUMMARY.

Districts of Louisiana, and in Desha and Chicot counties, Arkansas, and United States, as shown in foregoing statements.

Cubic Yards	Average Price per Cubic Yard—Cents	Cost	REMARKS
73,268	16.00	$ 11,722 88	
4,241,165	11.32	480.353 64	
4.314,433	11.40	$492 076 52	
719,026	16.53	118,868 52	
570,307	10.66	60,829 81	
2,304 027	12.90	297,282 01	
3,593,360	13.21	476,980 34	
1,795,207	13.41	240.778 56	$1,903.77 additional paid by the District.
370.727	12.19	45,220 27	
1,508,398	11.36	171,502 31	
3,674.332	12.45	457.501 14	
41,327	28.83	11,916 88	
283,916	13.17	37,405 39	
1,642,612	10.28	168,866 55	
1.967.855	11.08	218.188 82	
894,764	9.66	86,476 70	
298,987	11.71	34,431 15	
1,258 234	12.59	158,437 03	
2,446,985	11.41	279,344 88	
577,368	18.17	104,937 00	No tabulated statement.
999	12.50	124 87	
101,439	11.61	11,779 45	
412,860	12.62	52,135 48	
515,298	12.43	64,039 80	
22,544	15.05	$ 393 19	
39 796	12.67	5 042 60	
34 817	11.63	4 049 84	
97,157	12.85	12,485 63	

Digitized by Google

APPENDIX A. STATEMENT

LOCALITY	BY WHOM DONE	MILES OF	
		Ne Levee	Enlargement
Caddo Levee District	District	12.33	4.50
	State	1.26	16.32
	United States	2 60	4.58
	Totals	16.19	25.40
Bossier Levee District	District	1.94	0.98
	State	8.09	4.98
	United States	2.55	
	Totals	12.58	5.96
Red River, Atchafalaya and Bayou Bœuf Levee Disiriot	District	0.21	4.21
	State	4.74	4.70
	Totals	4.95	8.91
RECAPITULATION			
Districts		52.58	108.25
State		23.76	66.15
United States		98.93	201.30
Aggregates		175.27	370.70

Additional amounts paid by Districts and Uuited States as above .....

NOTE—The cost and average prices of the United States Levee Work, as above contract prices at which the work was undertaken, this item not having been obtain close approximations.

Digitized by Google

No. 16—Continued. SUMMARY.

Cubic Yards	Average Price per Cubic Yard—Cents	Cost	REMARKS
512,602	14.76	$75,643 93	$1,132.79 additional paid by District.
301,103	11.37	34,251 60	
354,721	13.81	48,996 16	$1,201.00 additional paid by United States.
1,168,426	13.59	$158,891 69	
145,010	14.81	$21,470 89	$20.000.00 additional paid by District
393,741	5.80	22,845 76	
261,455	14.39	37,623 44	$100.00 additional paid by United States.
800,206	10.28	$81,940 09	
86,697	12.64	$10,949 80	
422,790	9.74	41,202 24	
509,487	10.23	$52,152 04	
4,868,812	14.09	$ 686,283 22	
2,777,806	10.54	293,008 27	
12,018,289	11.80	1,419,246 46	
19,664,907	12.19	$2,398,537 95	
.....		24,637 56	
		$2,423,275 51	

stated, are made up from the best information we have been able to secure as to the able in all cases, from official sources; they are, therefore, only to be considered as

Digitized by Google

Digitized by Google

APPENDIX B.

Sundry Reports of Board of State Engineers to Boards of Levee Commissioners and Police Juries.

Digitized by Google

Digitized by Google

APPENDIX B.

SUNDRY REPORTS OF BOARD OF STATE ENGINEERS TO BOARDS OF LEVEE COMMISSIONERS AND POLICE JURIES.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, La., March 23, 1896.

To the Honorable Board of Levee Commissioners for the Tensas Basin Levee District, Rayville, La.:

GENTLEMEN—In compliance with the request contained in your resolution of February 1st, ult., the following is respectfully submitted relative to the condition of levees in the district and in Arkansas, designed for or aiding in the protection of the Tensas Basin Levee District.

On a recent trip of inspection by Mr. Kerr, of this Board, and the undersigned, the levee on the Ouachita, in the vicinity of Charleston, below Monroe, where threatened by caving banks, was visited and surveyed, and the levee lines on the Arkansas River, in Jefferson, Lincoln and Desha counties, inspected, as also the system extending from Amos Bayou down Cypress Creek and the Mississippi River.

The protection of the Tensas Basin Levee District against overflow is, of course, well understood to mainly depend upon the integrity and security of the levees in Chicot and Desha counties, Arkansas, along the banks of the Mississippi River and Cypress Creek.

It is gratifying to be enabled to report this line of levees as being generally in excellent condition. So far as can be ascertained from inspection and the data kindly supplied by Captain Townsend, Corps of Engineers, United States Army, there is no part of this line which has a grade less than three feet above the highest known water, except, perhaps, a few points (mostly in Chicot county) where the shrinkage has been more than the average, and the railroad embankment which forms the levee in front of Arkansas City in Desha county (all of which, probably aggregates less than a half mile in length), while a large part of it is four feet and over above high water mark. All this system now has a wide crown and rarely any side slopes steeper than three to one, and the great dikes forming a part of the line, such as at Boggy Bayou, O'possum Fork, Whiskey Chute, Grand Lake and Willow Lake, are among the largest, and, in appearance, the strongest to be found in any of the levee districts or anywhere.

This encouraging condition of affairs as regards the line in which you are most interested is, as you are aware, due to the work done during the past few years by the United States Government, under the direc-

Digitized by Google

tion of Captain Townsend, of the Corps of Engineers, United States Army, with funds allotted for the work by the Mississippi River Commission, in August, 1892.

The authorities of the Desha Levee Board are now engaged in raising and enlarging the levee in front of Arkansas City, and Captain Townsend proposes to raise the other low places above referred to. Some of the new levee work and enlargement above Arkansas City, now in progress by the United States contractors, may not be entirely completed before next June, but none of it appears in a condition to involve any danger, even if a high stage of water occurs at an earlier date.

The extension built by your Board two years ago up Amos Bayou Ridge, from the former head of the system to the Costello place, was never designed to have a higher grade than about two to two and a half feet above high water, nor a wider section than six feet crown and base five to one in addition. It has never become well covered with grass, and is now badly rain-washed. There is, however, a probability that Captain Townsend may have it enlarged this season to his standard section.

During the great floods of 1892 and 1893, a considerable volume of water from the Mississippi and Arkansas Rivers passed across the Amos Bayou Ridge, above the present head of the system, at the Costello place. But, whether or not, should floods of similar height in the Mississippi River occur now, they would pass over the ridge in such volume as to materially injure the Tensas Basin Levee District, is somewhat uncertain; for, not only has this extension of some six miles by way of the bayou, or about four miles by way of the levee line, been made up Amos Bayou since then, but the levees along the south bank of the Arkansas River have been extended down from Red Fork some twelve and a half miles nearer the Mississippi, and the Auburn Break in Lincoln county has been closed, so that no water directly from the Arkansas River should be felt on Amos Bayou, unless there were new crevasses on the Arkansas, which, unfortunately, is not improbable. This, however, is a problem which will, perhaps, be best solved by experience.

The levees along the south bank of the Arkansas River, taken as a whole, are not in such condition or of such size as to inspire confidence in their adequacy as a protection to the adjacent territory against extreme floods, or to lead to the opinion that the Amos Bayou line is an unnecessary adjunct to the system on which the Tensas Basin depends to guard it from overflow. If the whole line from Red Fork up to Noble Lake—some sixty miles—were built to the same standard as the twelve and a half miles below Red Fork, recently constructed by the United States, there might be no occasion for keeping up or extending the Amos Bayou line. But, at present, it does not appear probable that the United States will undertake levee work as far up the Arkansas River as this system extends, and the local Levee Boards seem unable to do more than keep up the ordinary repair required on the line they now

Digitized by Google

have. Indeed, it is hardly probable, they could hold it without accident through any great flood. The high water in the Arkansas River of last December, though barely passing the danger line at Little Rock, is reported to have been the highest of which there is any record along the larger part of the Lincoln county front.

This extraordinary stage of water in this locality is presumed to have been due to the closure of the large crevasse, known as the "Auburn Break," which had remained open for a number of years previous to 1894. The escape from the channel of a large proportion of the flood waters through this crevasse, during the time it remained open, is generally believed to have permitted an accumulated deposit of sand bars in the river below, which greatly deteriorated its capacity as a channel of discharge.

Though this high water appears to have attracted little attention beyond the immediate vicinity of its occurrence, it was evidently attended with great jeopardy to the levees; and destructive breaches in the line were only prevented by the most strenuous efforts of the local Levee Board, assisted by the officials and section hands of the Missouri Pacific Railroad Company. The levee known as the "Cummings' Loop," some five or six miles above Auburn Break, would have been overtopped and broken but for the work done when the water was nearly at its crest, and the Auburn Break Levee itself would have had little, if any, margin above the water had it not been recently topped with earth for about 6000 feet at its lower end by the district authorities. As a matter of fact, it may be stated that a small break actually did occur at the Cottonwood Saw Mill, a mile or so above the Auburn Break Levee, though it was closed before it resulted in any considerable damage.

The Lincoln County Levee Board has recently advertised for proposals to raise and enlarge the Cummings' Loop Levee, and will, undoubtedly, undertake other enlargement of its line to the extent of its means.

In this connection it should be stated that the Tensas Basin Levee Board is understood to have subscribed, in October, 1893, five thousand dollars ($5000) toward the closing of the Auburn Break, and that a levee was completed there in February, 1894, on the faith of this and other subscriptions. It contained about 90,000 cubic yards of earthwork, and was contracted for at 9.98 cents per cubic yard; so that its cost to the committee must have been nearly or quite $10,000.00. It is said that only one-half the subscription of the Tensas Basin Levee Board has been paid; for which there appears no good reason, and which is to be regretted, as so long as such a condition of affairs exists or is supposed to exist, it must tend to impair the credit and standing of the Board.

On the interior streams of your district there appears to be but few places where levees are necessary, so long as the flood waters of the Mississippi and Arkansas are excluded. There are several places on the banks of the Ouachita, Bonne Idee, Bœuf, Black, and, perhaps, other streams, where dikes should be maintained, and some bends, where the

Digitized by Google

banks are lower than the level of ordinary freshets in these streams, where levees should be kept up. One such place is the Charleston Bend on the Ouachita, about six miles below Monroe, in which is the dike across Bayou Machoir a l'Ours. Surveys for the construction of two short pieces of new levee, to substitute pieces threatened by caving bank, and for the enlargement and repair of the remainder of the line in this bend, have been recently made at the request of your President, of which maps, profile, estimate, etc., will be prepared and forwarded within a few days.

Considering the present situation of the Tensas Basin Levee District with reference to the entire line of levees designed for, or assisting in, protecting it against overflow, it appears more satisfactory and hopeful than ever heretofore. Except the comparatively small improvement required at Charleston, above referred to, there is no specific piece of work which the Board of State Engineers is at this time prepared to recommend for your immediate undertaking.

But the fact should not be lost sight of that the confinement of floods in the Mississippi River between levees appears, thus far, to have resulted as much in elevating the surface of the water as in deepening and enlarging the channel, and that, as the work approaches completion, it must probably be accompanied by, or rather largely consist in, a raising of grades and corresponding enlargement of section of the levees. There is reason to believe that you will not long remain satisfied with the degree of protection afforded by the existing levees along the Mississippi, greatly as they have been improved of late years, and whatever may be the result of complete confinement on the stage of great floods, there will always be caving banks in many places to require the construction of new embankments.

Under these circumstances it can never be good policy for your district to allow itself to become financially unable to meet any emergency which may arise, or to remit your care and provision for the maintenance and improvement of the levees which protect the district from overflow.

Respectfully submitted,
FOR THE BOARD OF STATE ENGINEERS,
HENRY B. RICHARDSON,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, September 15, 1894.

To the Honorable the Board of Commissioners for the Fifth Louisiana Levee District:

GENTLEMEN—Under the requirements of Act No. 48, approved June 30, 1894, the Board of State Engineers respectfully reports the following:

Section 10, of Act No. 44, of 1886, as amended by Act No. 48, of 1894, gives you authority to levy a special assessment not exceeding one

Digitized by Google

dollar ($1.00) per bale upon all cotton produced in the district "during each of the years 1894, 1895 and 1896," except "on cotton grown in that portion of Concordia parish affected by the waters from Bougere Crevasse," on which the limit of special assessment remains as in other years.

The operation of the amendment is strictly limited to the three years named, and it is provided that the "Board of State Engineers shall "make a survey and otherwise inform itself as to what cultivated lands "in the parish of Concordia are affected by the waters of the Missis- "sippi River flowing into said parish through said Bougere Crevasse, in "periods of high water, and make report thereof to the Board of Com- "missioners of said Fifth Louisiana Levee District," and, "make said "survey and investigation, and report thereon at the earliest moment "possible."

The Board of State Engineers having made the survey and investigation required, now has the honor to report for your information, that the only period of high water which has thus far occurred during the years to which the operation of the amended act is limited, was that of last April (1894), and that so far as can be ascertained, no lands now cultivated in cotton were overflowed or affected during said period of high water by the waters of the Mississippi River flowing into said parish through said Bougere Crevasse.

Should other periods of high water occur in the future, during the years to which the operation of the amended act is limited, the Board of State Engineers will endeavor to report to you as promptly as possible, as required by the act.

Respectfully submitted,

THE BOARD OF STATE ENGINEERS,

Per HENRY B. RICHARDSON,

Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, July 13, 1895.

Hon. F. L. Maxwell, President Board of Commissioners for the Fifth Louisiana Levee District, Delta, La:

SIR—At your last meeting, which was held on August 6, 1894, the Board of State Engineers made a verbal report on the condition of your levees as compared with previous years, and they also submitted for your information a detailed statement showing approximate quantity of work required to place the same in what might be considered a uniform condition as to height and strength throughout the entire length of the district.

At that time it was assumed that the balance of the United States funds available for levee work from Bedford Landing down to Bougere Crevasse (Lower Tensas District) would be more than sufficient to place

Digitized by Google

the levees in that portion of the district up to the provisional standard of three feet above the highest water of previous years, and to a uniformity of strength with that adopted for new and improved levees, provided a few very low and weak points were at once placed in a condition to give better security against a high water the coming season; while it was well known that the levees from Bedford's up to the Arkansas line (Middle Tensas District) required a very great amount of improvement to place them in a like condition, and that on account of previous large expenditures in the construction of new levees around caving bends, the available balance of United States funds would be totally insufficient in that portion of your district.

With the condition as above described, your Board wisely resolved to at once pick out from the list of weak and low points reported those of the greatest importance to the entire district, and with such means as you might possess, at least bring them up to the provisional standard of height and strength before another high water season, and thus leave for possible high-water fight the strongest and highest of existing levees.

The work undertaken and completed by resolutions of your Board during the season of 1894-95 is shown in the following table:

Table showing amount of levee work done under resolutions of the Board of Commissioners for the Fifth Louisiana Levee District, dated July 13 and August 6, 1894, according to measurements and certificates made by the Board of State Engineers of Louisiana:

Name of Contract.	Parish.	Cubic Yards.
Bunche's Bend	East Carroll,	165,266
Wyly Crevasse Banquette	East Carroll,	19,668
Holly Brook	East Carroll,	124,869
Salem Banquette and Carson Bayou	East Carroll,	28,852
Villa Vista Banquette	Madison,	*28,000
Buckhorn	Tensas,	22,724
Milliken's Bend Banquette	Madison,	25,890
Milliken's Bend to Nebraska	Madison,	69,095
Willow Slough	Madison,	38,983
Young's Point to Delta	Madison,	20,478
Towne	Madison,	21,079
Diamond Island	Madison,	103,397
Bruin Bayou	Tensas,	24,451
Duckpond	Tensas,	8,960
Marshall	Tensas,	8,771
Total		699,614

The contracts of McGuire & O'Donnell for clearing and grubbing of Christmas levee, in the parish of Madison, amounting to $1945.00 and the Palmyra Bend levee, in Tensas parish, amounting to $2090.00 are virtu-

*2787 cubic yards still due.

Digitized by Google

ally finished, and the certificate therefor may be expected at an early date. The work done by the State to give additional strength to those levees necessitated some extra clearing and grubbing by the contractors, which should be allowed by your Board when definitely determined.

At the date of your meeting there were State funds amounting to $40,000.00 available for levee work in the district; that sum having been allotted by the Board of State Engineers from the General Engineer fund, collectible on the rolls of 1894. As the levee just above the town of Lake Providence, in East Carroll parish, was threatened by caving banks and there was great probability of a new line being necessary later in the season, it was considered advisable to withold this sum temporarily to await developments at this point.

The Mississippi River Commission, at its meeting, about September 1, 1894, evidently appreciating the comparative difference in the amount of levee work necessary in the Middle Tensas District and the Lower Tensas District, with the balance of funds available, saw proper to transfer $80,000.00 from the Lower to the Middle Tensas District, and to make $40,000.00 available for immediate work. At the same time, Captain C. McD. Townsend, United States Engineer in charge of the third district, had started the bank revetment at Lake Providence, with every reason to believe the work would cover and prevent further caving at the threatened point of the levee line above said town.

This change in financial conditions necessarily changed the aspect for levee work between the upper and lower portions of the district, and as your Board had placed the bulk of its funds above Bedford Landing, it was on November 12, 1894, considered advisable, for the purpose of keeping uniformity in the improvement of the entire system, to utilize the available State funds, as far as possible, on the low grade levees immediately below Bedford Landing, in the upper end of the Lower Tensas District, and thus leave the United States' engineers free to choose work which might be, in their opinion, of greatest necessity in each of their respective districts.

The following tabulated statement will show the amount of work done by the United States from August 6, 1894, to date:

	Cubic Yards.
Opposum Point—East Carroll	41,829.50
Lake Providence—East Carroll	38,265.20
Otter Bayou to Point Lookout—East Carroll	70,800.10
Wilton to Salem—East Carroll	86,286.60
Hard Times Wilson—Tensas	27,818.98
Hard Times—Tensas	25,449.74
Kempe, upper section—Tensas	60,218.79
Kempe, lower section—Tensas	50,916.25
Deer Park—Concordia	17 958.25
Forest Home—Concordia	94,267.54
Fish Pond Gap—Concordia	623.00
Ashley—Concordia	37,772.40
Total	552,206.35

Digitized by Google

The Reid levee in Madison parish, upon which work has been progressing steadily, was placed under contract previous to August 6, 1894. Work done on same to date amounts to 471,029.5 cubic yards.

The work placed in position to date from State allotment is as follows:

Christmas, Madison, 90,000 cubic yards; Palmyra Bend, Tensas, 285,135; total, 375,135.

The completion of the above levee work has placed your existing levee line in such an improved condition—far beyond any reason of expectation when your Board was last called together—that you have every reason to congratulate yourselves and community, even ignoring the fact that you were favored with a low water season this spring and summer.

Within the past month the United States engineers have placed under contract the following levee work in your district from funds alloted for that purpose, and to be expended during the season of 1895-96:

	Approximate cubic yards.
Louisiana Bend—East Carroll	60,000
Bunches' Bend—East Carroll	60,000
Wilson's Point—East Carroll	88,000
Donna Vista—East Carroll	60,000
Benham to Elton—East Carroll	90,000
Lake Providence to Deesona—East Carroll	33,000
Concord to Homestead—East Carroll	25,000
Atherton to Stamboul—East Carroll	78,000
Upper Wilton—East Carroll	48,000
Pecan Grove—East Carroll	55,000
Henderson—East Carroll	51,000
Buckhorn (Upper)—Madison	100,000
Buckhorn (Lower)—Madison	37,000
Milliken's Bend—Madison	36,000
Delta—Madison	25,000
O'Brien—Madison	40,000
Kempe (Middle)—Tensas	50,000
Hard Times (Wilson)—Tensas	182,500
Total	1,118,500

The amount of work necessary to complete the improvement of the line from Bedford's to Buck Ridge will exceed the $40,000.00 allotted from the State fund to your district last season; the Board of State Engineers have, however, decided to continue work on same to the extent of $15,000.00 of any allotment which may be made to your district for 1895-96 later in the season.

The improvement which your levee line has undergone since the

Digitized by Google

high water of 1892, is especially marked and encouraging, as it far exceeds that of any previous period in the same length of time.

The total amount of levee work placed in position, from April, 1892, to date, is as follows:

	Cubic Yards.	
By the United States Government	3,281,532	$529,294 73
By the State of Louisiana	1,018,485	122,330 88
By the District	1,654,661	321,651 44
Total	5,954,678	$973,277 05

The approximate amount of work now under contract and not included in the above is:

	Cubic Yards.	
By the United States Government	1,218,500	$129,958 60
By the State of Louisiana	140,000	15,000 00
Total	1,358,500	$144,958 60

We are gratified to say that the United States engineer officers, Capt. C. McD. Townsend, Capt. John Mills and Capt. Geo. McC. Derby, and their respective assistants, have at all times acted in perfect harmony with the members of the Board of State Engineers, and we are indebted to them for courtesies, attention and valuable information.

As to the balance of United States funds available for levee work during the coming season, and to what extent the same may continue, the improvement of your levee line cannot now be determined, though it is certain that a considerable amount of work will be done, and as the State funds to be available for levee work during the season cannot at this time be properly alloted, we would suggest that your Board defer action as to the undertaking of actual levee work until later in the season, when you can place any means you may have available to the best advantage of the entire district.

We would again most respectfully call your attention to the following extract from the report of the Board of State Engineers, made to your Board on March 30, 1887, and suggest that you, at least to some extent, try the system proposed:

"Numerous minor repairs of various kinds are constantly needed to maintain the levees in a secure and efficient condition—even those of most ample proportions and least subject to deteriorating influences—and much of the work required for such repairs is of a nature that cannot well be put under contract in the ordinary way.

"The cutting out and refilling of crayfish holes and other leaking places, for instance, and the removal of stumps and roots, the filling of abrasions due to wave-wash, travel, the passing of stock, etc., and the opening and clearing of sipage and drainage ditches, frequently cannot be properly measured or estimated by the cubic yard. The cutting of weeds, bushes and trees, the planting and trimming of grass and hedges,

Digitized by Google

or the construction of revetments and other protective works, are undertakings of such varied character as to render their execution under any simple form of contract almost impracticable.

"It is, I think, certain that nearly all of this class of work can be most economically executed by forces paid by the day or month, and worked under the supervision of experienced foremen.

"I would, therefore, suggest that a number of such foremen be employed at an early date—say one for each parish of the district—that they pass through their parishes at the decline of the floods, observing the leaky, low or wave-wash places, and familiarize themselves with the repairs required; and that as soon as practicable they be authorized to employ such forces as your Board may deem sufficient—say from ten to thirty hands each, or more if necessary—and be furnished with tools, tents, etc., and begin opening sipage ditches, cutting out crayfish holes, clearing weeds, brush, trees, etc., and afterwards opening ditches to drain the areas on the inner side of the levees, and later still in the season, filling in wave-washes, raising low places and building ramps or bridges, etc.

"The economy of such work would necessarily depend in a great degree upon the character and judgment of the foreman in charge of the force; but, in my opinion, $25,000.00 to $50,000.00 per annum might be profitably expended in the Fifth Louisiana Levee District in this manner, which would probably add more to the efficiency of the levees of the district than the same sum applied in any other way."

If you should decide to try this plan, the Board of State Engineers would readily furnish any lines and levels required.

It is hoped that your Board will not permit this favorable change of conditions in your levee system to deceive you by forming an over-estimate of security from overflow and a belief that nothing more is necessary, as there is much yet to be done in addition to general repair and preservation before such a state of perfection can be expected.

The provisional grade and dimensions of the present improved line is only that which it is assumed will reasonably withhold the river within bounds should floods such as 1882, 1892 and 1893 be repeated with no breaks in the levee line between Memphis and Vicksburg on the east bank of the river, Amos Bayou and Bougere on the west bank, and all other conditions the same.

Even were this assumption correct, both generally along the entire line and at points where local changes may alter conditions, the improvement should be continued until a margin of at least three feet more in height was reached with section enlarged proportionately, to provide against conditions which might arise and which no one at this time can foresee.

The caving of river banks, causing breaches in the line, and thus necessitating large expenditures for the building of new levees, may be expected to continue from year to year and must be provided for.

Digitized by Google

Your system is also not complete until the existing gap at the lower end, known as Bougere Crevasse, and from thence to Red River, is closed. This is a work of considerable magnitude, but must be done at no very distant date.

Very respectfully,
BOARD OF STATE ENGINEERS.
Per H. Bol. Thompson,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, July 3, 1894.

To the President and Members of the Board of Commissioners of the Atchafalaya Basin Levee District:

GENTLEMEN—In connection with your regular meeting to be held on the 4th of July, 1894, we desire to submit to you the following report of the work done in your district during the last year, and of the work to be undertaken during the coming season.

It is appropriate to state first, that owing to the absence of a flood-stage in the river this year, and also owing to the fact that the forces under contract with your district were of such a nature as to be absolutely controllable, there was no interruption whatsoever in the construction of levee work in your district during the last period of high water. At one time the water got so threateningly high that the forces had to be moved away from the spots where they were then at work, but it was found possible to put them in other places so that the work should not be interrupted. As a result of this we dare say that the levee work in your district, at the present day, is as far advanced as it usually has been in the past years in the month of November.

Owing to the fact that the United States Government has announced its intention of doing enlargement work on the Mississippi River levees with the funds at its command, it has been decided by your Board to curtail its enlargement on said levees to a minimum and to throw the bulk of its forces on Bayou Lafourche, besides completing the work undertaken on the Atchafalaya River. Already three camps of convicts are at work on Bayou Lafourche, and on or about the 10th of July, the last camp will be withdrawn from the Mississippi River. The following figures give the amount of the work done under the James and other contracts in your district:

JAMES CONTRACT No. 1.

Prior to April 22d, 1894, on Mississippi River.

	Cubic Yards.
Section No. 3	124,256
Section No. 6	161,839
Section No. 7	103,534
Section No. 8	67,011
Section No. 10	89,367
Total	546,009

Digitized by Google

JAMES CONTRACT No. 2.

From April 22d, 1894, to the present day.

	Cubic Yards.
Section No. 3	29,594
Section No. 6	19,395
Section No. 7	128,099
Section No. 8	28,873
Section No. 10	45,088
Bayou Lafourche	14,736
Total	265,785

This makes a grand total of work on the Mississippi River, under the James contract up to date of 811,794 cubic yards.
Said contract being in existence since April 22d, 1893.

Under the same contract, on the Atchafalaya River, the following is the result up to date:

	Cubic Yards.
Section No. 1	9,072
Section A	74,672
Section B	18,680
Section C	50,944
Total	153,370

Under the Dodge contract, entered upon July 11, 1893, there has been placed in position on Bayou Lafourche up to date, 275,600 cubic yards. Under this heading a special mention ought to be made of the working of the dredge. The dredge boat began work on or about March 3, 1894, although under the terms of the contract it ought to have begun work not later than November 1, 1893; in other words, the dredge boat was four months behind contract time in beginning work. Since March 3d, up to present date, four months in all, under a liberal estimate, the dredge has covered 5865 running feet of enlargement, representing 45,141 cubic yards. This gives a rate of 11,285 cubic yards per month. It is scarcely to be expected that, as low as this average may appear, it may be equalled for the next four or five months as on account of the size and draught of said dredge, it is possible that it may not be able to work at all during the extreme low water stage on Bayou Lafourche. Again, when it will be able to resume work under favorable circumstances as the water again rises, this average ought to be increased as the contractor is constantly acquiring more experience in the handling of his machine, and as he is making certain changes on the boat which will tend to make it less subject to breakage.

The above lengthy report on the dredge work is made in order that your Board might understand that, in calculating upon the workings of the dredge, it should take its capacity into consideration and not rely upon its doing more work than the past reports show it can do. The

Digitized by Google

result of such an over-estimate would be the non-completion of the work undertaken on Bayou Lafourche, and to be completed prior to the 1895 high water.

The fact that barrow and scraper work is to be substituted to the proposed machine work renders it necessary to move the levees back wherever they are so close to the bank as to preclude the possibility of their being enlarged. In moving said levees they have been moved back only far enough to obtain sufficient earth to build them. As a rule this distance has been made 80 feet from the existing lines of levee; but in some places where large pits are in existence and where the refilling of said pits was considered unadvisable from the standpoint of cost and safety, these levees have been moved as far back as 125 feet from the existing lines.

All of the work necessary from the present date, in order to complete the Lafourche levees down to Lafourche Crossing, before the 1895 high water, has been laid off with the following result:

Nineteen new levees will have to be built, representing 35,489 running feet, or 6.7 miles in length. 27,750 running feet, or 5 miles, of old levee, will have to be enlarged. Enlargement and new levees together, will amount to about 800,000 cubic yards; all of which can be completed in time for the next high water.

In accordance with your request, the State has let out a contract on Bayou Lafourche and will spend all of its allotment to your district on that stream, if you so direct it. The State contract let out is at the price of 12.45 cents per cubic yard.

On the Atchafalaya River, bank surveys have been completed recently. It was found impossible owing to the high stage of that river at the time to stake out the balance of the work there The work, however, will consist of 1800 feet of levee to connect Garwood and Humphrey's Bayou dikes, and of dikes at Syphon, Cowhead and Cross Bayous.

We take occasion to mention in this report, knowing that it is a matter of great interest to your Board, that the enlargement of Morganza, undertaken last fall and shortly to be completed, will contain nearly 172,000 cubic yards, at a cost of about $38,400.00.

The above covers the main points to be submitted to your consideration at this meeting.

Very respectfully yours,
THE BOARD OF STATE ENGINEERS,
Per ARSENE PERRILLIAT,
Assistant State Engineer.

Digitized by Google

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, October 27, 1894.

To the Honorable, Board of Commissioners, for the Atchafalaya Basin Levee District:

GETLEMEN—The following is respectfully submitted in compliance with the request contained in your resolution of October 3d, inst., that the Board of State Engineers report at your next meeting their opinion on the practicability of closing the head of Bayou Lafourche by a dike, or by locks; as to whether such closure would be advantageous to your district, and as to whether it could be so done as not to interfere with navigation.

(1) There can be no doubt as to the entire practicability of closing Bayou Lafourche at or near its head by ordinary earthen dike or levee. The construction of such a levee would present no unusual difficulties and the quantity of earthwork required would not be greater than that in many other dikes already existing in your levee system. Neither is there any doubt as to the practicability of placing a lock in the head of the bayou in such a manner as to permit the passage of all craft capable of navigating it to and from the Mississippi River at any stage of the water. The cost of a lock would, of course, be much more than that of a simple earth dike; and a considerable expenditure would be constantly necessary for its operation and maintenance, while the expense of keeping a dike in repair should be very small.

(2) The advantages to be gained by closing the head of Bayou Lafourche against the flood waters of the Mississippi River, not only to the Atchafalaya Basin Levee District, but also to the Lafourche Basin District, are so great and obvious as to have enforced the attention and approval of nearly all engineers and officials in charge of public works during the past forty years. Numerous reports have been made on the subject, recommending its closure, and in 1876 the State Commission of Levee Engineers passed a resolution directing the work to be undertaken, and surveys were made for the proposed dike (on the line of Iberville street, Donaldsonville), estimated to require 20,362 cubic yards of earthwork.

Within your experience as a Levee Board, you have expended some $113,000.00 for levee work on one bank of the bayou, and have seen the Commissioners of the Lafourche Basin District do work on the other bank at a cost of about $159,000.00; all of which, with some $118,000.00, expended by the State, or an aggregate of say, $390,000.00, would have been unnecessary and uncalled for had the bayou been closed against the high waters from the Mississippi. And with all this, the work of levee building on Bayou Lafourche is by no means finished; nor, so long as the silt-bearing waters of the Mississippi are not excluded from it, can the extent to which it must be carried in the future be predicted. Nearly one-third of the length of the bayou is scarcely leveed at all, and the levees along the other two-thirds are still insufficient.

Digitized by Google

The cost of levee building and maintenance to be saved, and the security against direct overflow from the bayou that might be effected by the building of an inexpensive dike at Donaldsonville, should afford sufficient reasons for its undertaking; but in addition to these advantages the facilities for the drainage of adjacent lands would be greatly improved, and also the fact should be specially considered that the approved plan for improving navigation in the bayou, as adopted by Congress, contemplates, as an essential feature, that the head of the bayou shall be closed against flood water by a lock.

(3) The closure of Bayou Lafourche at its head need not interfere with its navigation. In fact, most of the plans which have been proposed for the improvement of its navigation have contemplated such closure as an important if not necessary feature.

Various plans suggested by different persons for the improvement of the bayou are stated and discussed in the report of Lieutenant Crosby, Corps of Engineers, U. S. Army, dated June 11, 1886, and to be found on page 1267, et. seq., Annual Report of the Chief of Engineers, U. S. Army, 1886; and the plan preferred is "to construct a lock at Donaldsonville, and to convert the bayou, by dredging, into a navigable arm of the sea." The cost of a lock 300 feet long and 50 feet wide was estimated at $190,000.00, and the dredging of a channel 75 feet wide, down to five feet below mean low tide at $240,000 00. This project was approved and adopted by act of Congress in 1888, when an appropriation of $50,000.00 was made for beginning the work. Subsequent appropriations for continuing improvement have been made by Congress, as follows: In 1890, $50,000.00; in 1892, $50,000.00, and in 1894, $40,000.00; making an aggregate, since the adoption of the project, of $190,000.00, or as much as the original estimated cost of a lock. Expenditures from these appropriations have thus far been made only for dredging, which have been of only temporary value, and, as is well understood, can accomplish little or nothing toward the permanent improvement of the bayou without the exclusion of the muddy waters of the Mississippi.

As already stated, the closure of Bayou Lafourche at its head is an essential feature of the plan for its improvement, and every effort should be made to induce Congress to appropriate a sufficient sum to build the locks at the earliest date possible.

Respectfully submitted,

THE BOARD OF STATE ENGINEERS,

Per HENRY B. RICHARDSON,

Chief State Engineer.

Digitized by Google

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, April 13, 1896.

To the Honorable President and Commissioners of the Atchafayala Basin Levee District, Port Allen, La.:

GENTLEMEN—On the occasion of your regular meeting, to be held this day at Port Allen, we beg to submit to you the following report regarding your levees, and the levee work done and yet to be undertaken in your district. We have thought it would be interesting to recapitulate the work done in your district from all sources in the last two years; that is, from April 20, 1894, to the present date, and we, therefore, submit to you the accompanying tables, which show the amount of work done by the district and State, giving the name of the various contracts under which said work was done, the linear feet of enlargement or new levee put up, the yardage of same, and the cost of the work. The tables further state on which stream the work was done, whether on the Mississippi River, Atchafayala River, or Bayou Lafourche.

Summing up, we find the following totals for the work done in your district during the last two years:

	Linear Feet.	Miles.	Yardage.	Cost.
By the District	241,160	.....	1,795,207	$240,778 56
By the State	34,691	.....	368,266	44,906 49
Totals	275,860 or	53	2,163,473	$285,685 05

Of this the division by streams would be as follows:

	Linear Feet.	Yardage.	Cost.
On the Mississippi River	77,469	557,214	$ 74,982 70
On the Atchafalaya River	65,726	518,098	73,227 32
On Bayou Lafourche	132,665	1,088,161	137,475 03
Totals	275,860	2,163,473	$285,685 05

And, moreover, the 53 miles of work thus done, represent 22½ miles of new levees, and 30½ miles of enlargement of existing levees.

In addition to the above, we submit to you another table, giving the work put under contract in the A. B. L. D. by the United States Government for the season 1894-95, and that put under contract and to be placed under contract for the season 1895-96, thus covering approximately the period of the last two years.

From this table, in which only the name of the levee and its yardage are given, it will be seen that during the season 1894-95 the United States Government did 1,036,091 cubic yards of work in the A. B L. D., and for the season 1895-96, it has done and proposes to do 1,600,644 cubic yards, a grand total of 2,636,735 cubic yards of work done by the United States Government in about the last two years. This work represents new levees and enlargement done on your Mississippi River front only, as the United States Government does not extend its operations to the tributary streams in your district. We have no definite means of ascer-

Digitized by Google

taining the cost of the above work, but it is approximately fair to suppose that this work represents two years of allotment made to the A. B. L. D. by the Mississippi River Commission, or about $304,000.00.

The general condition of the levees in the A. B. L. D. is as follows: The levees on the Mississippi River front are all, or will be at the conclusion of this season's work by the United States Government, more than 2½ feet above the highest flood line of the past. Of these levees probably two-thirds are 3 feet, or more, above the high water level, some of the line being built on a grade 4 feet above high water mark. It is probable that if the United States Government continues its appropriation for levee building on the Mississippi River, the grade which it will adopt will be 4 feet above the high water plane of the past. In addition to the standard of height, at which your levees now are, in section they generally have 6, or more, feet of crown, with slopes of 3 horizontal to 1 vertical on both sides, which might be fairly described by saying that on the Mississippi River your levees have a base equal to seven times their height.

On Bayou Lafourche the work done up to date has practically brought the levees from Donaldsonville to Lafourche Crossing, a distance of about 39 miles, to a standard of 3 feet above the highest water of the past, though the standard of section adopted there is 6 feet of crown, with slopes of 3 to 1 on the river side, and only 2 to 1 on the land side, or a base approximately equal to six times the height. This reduction of standard was rendered necessary by the great quantity of work required on that stream, which made it advisable to cut down the section in order that the money available might extend as far as possible. From Lafourche Crossing down only little work has been done, and about 25 miles out of 34 miles of levees in that section are barely as high as the high water level of the past, while their crown will barely average 3 feet and their slopes 1½ to 1 on either side.

On the Atchafalaya River a great deal of work has been done in the past two years, the levee line having been continuously extended some nine miles down that stream, from Garwood Bayou to a point about half a mile below the railroad crossing at Melville, by the construction of about 7½ miles of new levees. The extension of this levee line, although it runs through a wilderness, will have as an immediate beneficial effect the suppression of the back water from the Atchafalaya which at every flood was so destructive to the Letsworth, Raccourci, Old River and New Texas Settlements in Pointe Coupee parish. The standard of section adopted on the Atchafalaya River now is full sized, being a grade of 3 feet above the highest water with slopes of 3 to 1 on both sides. A contract is now in existence under which these levees are rapidly being brought to this standard, and it is safe to say that 200,000 cubic yards more will bring the entire Atchafalaya line to it.

The immediate work which therefore lies before your honorable Board for execution, is the completion of this Atchafalaya River Levee enlargement, and especially the undertaking of levee work on Bayou

Digitized by Google

Lafourche from Lafourche Crossing down on the 25 miles mentioned above. In connection with this, we wish again to refer to the advisability of enlarging the existing levees, if possible, rather than building new ones, for the obvious reasons that the yardage in constructing new levees will be about 1⅔ times that of the yardage required to enlarge the old ones, and also because the building of new levees on the Lafourche entails considerable damage to the property of a poor population, which is ill able to stand it. Moreover, as caving is of very rare occurrence on Bayou Lafourche there is no danger in enlarging the existing levees even though they be very close to the bank. For the above reasons, we would recommend that you investigate fully and thoroughly the enlargement of said levees by machinery, which would take the earth from the bed of the bayou and place it on the levees. We believe such a plan to be advisable both from a practical and economical standpoint.

While the above works, which are submitted to you, deserve attention, sight should not be lost of the requirements of the Mississippi River line of levees. As shown above, the United States Government appropriations have been able to supplement the expenditures which you have undergone on the Mississippi River front, and there is every reason to believe that the renewed national appropriation for the Mississippi River, which will be made in the Rivers and Harbors Bill, will pass Congress. Yet, the facts mentioned in our report to you, of April 5th, 1893, and in our report to the Governor of Louisiana, of April 20, 1894, compel us to urge you to keep in mind that the levees on the Mississippi River must be incessantly raised, enlarged and strengthened, until some great flood in the future, when all of the levees shall have held and all of the water shall have been confined within the river, shall demonstrate beyond peradventure what grade must be finally established for our levees.

This is the work which the United States Government is now helping you to perform, but which you must be prepared to carry out alone, should national aid fail us, as has already been the case in the past.

Very respectfully submitted,

THE BOARD OF STATE ENGINEERS.

Per ARSENE PERRILLIAT,

Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, July 11, 1895.

To the President and Commissioners of the
Lafourche Basin Levee District:

GENTLEMEN—I beg leave to report that, in accordance with your request, as expressed in a resolution of the 5th of June, ultimo, I have had staked and estimated upon the following list of levee work, as required in sections 1, 2, 3, 5, 6, 7 and 8, on Bayou Lafourche:

Digitized by Google

ASCENSION PARISH.

SECTION 1.

NAME	Station to Station	Length	Yards per Foot	Ave. Height	Crown	Slopes	Cubic Yards	Remarks
Jules Plaisance	148 to 161	1198	11.1	9.6	6	3-3	15,000	B, New
Jules Plaisance	161 to 171	1000	4.0	.....	6	3-3	4,000	B, Enl.
Crescent Quarters	207 to 227	1440	7.0	.....	6	3-3	10,000	A, Enl.
Total for Section 1							29,000	

ASSUMPTION PARISH.

SECTION 2.

Valenzuella	0 to 35	3482	4.8	.....	6	3-3	17,000	B, Enl.
Belle Alliance	35 to 46	1070	.....	9.5	6	3-3	13,000	A, New
Belle Alliance, Front	46 to 86	4000	.....	.....	6	2½-1	18,000	B, Enl.
Scattery	86 to 103	1780	.....	9.2	6	3-3	21,800	B, New
Scattery	103 to 127	2400	.....	.....	6	2½-1	10,000	B, Enl.
Comi Truxillo	180 to 261	.....	.....	.....	6	3-3	40,500	B, Enl.
Total for Section 2							120,300	
To enlarge Scattery, instead of new levee						2½-1	8,000	

SECTION 3.

College Point	0 to 38	2445	.....	.....	6	3-3	7,500	B, Enl.
Plattenville	38 to 53	1619	.....	.....	6	3-2	20,000	B, New
Hypolite Templet	160 to 221	5100	.....	.....	6	3-3	25,000	A, Enl.
Locust Grove	221 to 262	4100	.....	.....	6	2½-1	25,000	A, Enl.
Locust Grove	262 to 294	3230	9.8	.....	6	3-3	45,000	A, New
Total for Section 3							122,500	
To enlarge Plattenville, instead of new levee						3-2	6,500	

LAFOURCHE PARISH.

SECTION 5.

NAME	Station to Station	Length	Yards per Foot	Ave. Height	Crown	Slopes	Cubic Yards	Remarks
Jeffries Foundry	336 19 to 256 10	1891	7	.....	6	3-3	14,000	A, Enl.

SECTION 6.

Laurel Valley	106 to 185	2986	.....	10.8	6	3-3	47,000	B, New
Gossin Store	135 to 178	4300	7	.....	6	3-3	30,000	B, Enl.
Cognier-Gaudet	178 to 193	1580	.....	12.0	6	3-3	30,000	A, New
Gaudet	193 to 203	1000	7	.....	6	3-3	7,000	A, Enl.
Gaudet to Crossing	203 to 232	2950	.....	12.0	6	3-3	58,000	A, New
Below Crossing	233 50 to 283 50	5000	3½ to 6	.....	6	3-3	25,000	B, Enl.
Gaubert Settlement	283 50 to 345 30	6400	.....	11.6	6	3-3	120,000	A, New
Melodie to Chauvin	345 30 to 405 90	6420	.....	.....	6	3-3	45,000	B, Enl.
Total for Section 6							362,000	
Total for Section 6, with 2 to 1 on land side							275,000	
To enlarge from 203 to 232 instead of new levee					6	3-2	17,000	

Digitized by Google

SECTION 7.

Chauvin to Thibodeaux Store	0 to 13	1854	.....	10.7	6	3-3	33,000	B, New
Thibodeaux Store to Ariel	13 to 51	....	.....	.....	6	3-3	25,000	B, Enl.
Wauguespack	51 to 67	1650	.....	11.9	6	3-3	32,000	A, New
Wauguespack to Knoblock	67 to 145	.....	.....	.....	6	3-3	55,000	B, Enl.
Knoblock to Folse	145 to 162	1708	.....	12.3	6	3-3	35,000	A, New
Folse to Theriot	162 to 189	.....	.....	.....	6	3-3	20,000	B, Enl.
Theriot to Lepine	214 to 266	.....	... ...	.....	6	3-3	25,000	B, Enl.
Lepine to Upper Ten	285 37 to 316	.....	.....	.....	6	3-3	22,000	B, Enl.
Total for Section 7							247,000	
Total for Section 7, with 2 to 1 on land side							155,000	

SECTION 8.

Bourg	338 80 to 385	4580	.....	11.5	6	3-3	95.000	A, New
Bourg	385 to 396	1100	.....	5.0	6	3-3	5,000	B, Enl.
Total for Section 8							100,000	

A—Work of prime importance.

B—Work of secondary importance.

SUMMARY.

		A	B
Section 1	Ascension Parish	10,000	19,000
Sections 2 and 3	Assumption Parish	108,000	134,800
Sections 5, 6, 7 and 8	Lafourche Parish	391,000	332,000
Totals		509,000	485,800
Grand Total			994,800

Respectfully submitted,

SIDNEY F. LEWIS,

Assistant State Engineer.

Digitized by Google

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, April 9, 1896.

To the President and Commissioners of the
Lafourche Basin Levee District:

GENTLEMEN—The levee line of the Lafourche Basin Levee District fronting on the Mississippi River, from Donaldsonville to the lower limits of the district, some 120 miles in length, stands to-day 3 feet, and in many stretches, 4 feet above the highest known flood in the lower river. This length of levee line has also been enlarged with increased crown of 6 to 8 feet, and slopes of 3 and 2 to 1, and 3 and 3 to 1, proportionately, in accordance with height of levee above the natural surface—whilst it is a matter for congratulation that the great amount of levee work, representing some 7,000,000 cubic yards, has been placed upon the levees since the organization of your Board; yet, there will always require vigilance and activity, as in the past, on the part of the Commissioners, in ensuring your embankments from the ravages of destructive agents, the proper drainage of ponds in low water, the restoring of wave-wash, the repair of existing revetments, the mowing down of weeds and growth detrimental to the levees and the cutting out and refilling of crayfish holes.

During this season the State has undertaken the construction of the Bourg and Choctaw levees, on Bayou Lafourche, some 132,371 cubic yards, at a cost of $16,606.09.

In accordance with your request, as expressed in a series of resolutions at stated meetings, notes have been issued and an estimate of contents made for the following levees under the terms and conditions of contract "Bayou Lafourche Levees," Hart & White, executors of estate of S. L. James, contractor.

The following table also shows the progress of this work since last estimate:

ASCENSION PARISH.

SECTION 1.

NAME.	Cubic Yards.	Total.	REMARKS.
Jules Plaisance (New)	15,736.0		Completed.
Jules Plaisance (Enlargement)	2,664.4		Completed.
Crescent Quarters	9,435.6		Completed.
		27,836.0	

Digitized by Google

ASSUMPTION PARISH.

SECTION. 2.

Valenzuella	16,739.2		Completed.
Belle Alliance (New)	22,964.9		Completed.
Belle Alliance (Enlargement)	11,811.5		Completed.
Scattery (New levee)	21,665.6		Completed.
Scattery (Enlargement)	10,376.9		Completed.
Scattery to Franklinville	11,271.2		Completed.
Comi-Truxillo	32,438.8		Under way.
		127,268.1	

SECTION 3.

College Point	4,672.1		Completed.
Plattenville	20,236.7		Completed.
Templet	19,088.4		Completed.
Locust Grove	103,922.3		Completed.
		147,919.5	

LAFOURCHE PARISH.

SECTION 5.

Jeffries Foundery	11 783.0		Not begun.
		11,783.0	

SECTION 6.

Laurel Valley	46,955.1		Completed.
Gossin Store	18,989.5		Completed.
Coignet Gaudet	59.280.5		Completed.
Gaudet to Crossing	47,765.9		Completed.
Below Crossing	21,474.5		Completed.
Gaubert Settlement	107,281.8		Under way.
Melodia to Chauvin	55 000.0		Not begun.
		356,737.3	

SECTION 7.

Waguespeck	30 557.0		Not begun.
Knoblock to Folse	33,452.3		Not begun.
Lepine to Upper Ten	14,126.3		Not begun.
		78,135.6	
Total		749,679.5	

Digitized by Google

Of which over 550,000 cubic yards have been completed.

There is yet considerable levee work to be done on the Lafourche to bring the remaining levees up to grade and section. An approximate yardage for same can only be arrived at after you have made a thorough examination of the levee line on this stream, and determined upon in detail what will be the character of the work that you will undertake to do.

The following is a list of levee work undertaken this season up to date by the United States Government, in the district, on the Mississippi River:

NAME OF LEVEE	MILES—B. C.	DATE OF COMPLETION	LENGTH IN LINEAR FEET		TOTAL YARDAGE
			New Levee	Enlargement	
Winchester	897	Jan. 17, 1896		6,687	30,782.56*
Welcome	898			7,047	33,456.14*
Barton	899	July 3, 1895	1,087	1,128	14,499.82
St. Claire	900	Dec. 6, 1895		6,207	25,470.46
St. Cecile	901	Dec. 15, 1895		6,219	26,075.60
St. James' Church	902			5,900	25,876.27*
St. James' Estate	902			4,232	17,528.85*
Bonsecour	903	Aug. 15, 1895		5,494	22,136.96
Rich Bend to Bonsecour to Poor Devil	904-15			30,271	141,721.05*
Poor Devil	915	Aug. 3, 1895	6,099		18,419.71
Willow Grove	917	Dec. 24, 1895		7,852	30,653.80
Carroll	918	Mar. 5, 1895		5,756	28,172.69
Maxie	921	Dec. 5, 1895		5,800	26,549.05
Columbia	922	Nov. 12, 1895	1,745	1,558	26,358.52
Le Bœuf	922	Nov. 19, 1895	1,848	1,821	25,534.00
Hymelia to Songy	927			25,228	121,040.11*
Star No. 1	934			3,900	16,785.07*
Star No. 2	934			2,725	16,253.04*
Fashion	937	July 18, 1895	3,678		35,073.60
Davis to Lone Star—					
Section No. 1	944	Feb. 17, 1896		2,917	19,921.99
Section No. 2	944			3,655	22,975.79*
Witherow	953	Jan. 17, 1896		406	2,287.81
Starlight	954	Feb. 6, 1896		2,771	16,808.68
Waggaman	954	Jan. 17, 1896		3,245	20,632.03
Columbia Garden—Section No. 2	959			6,868	28,355.68*
				Total above the city	793,367.28

Digitized by Google

NAME OF LEVEE	MILES—B. C.	DATE OF COMPLETION	LENGTH IN LINEAR FEET: New Levee	LENGTH IN LINEAR FEET: Enlargement	TOTAL YARDAGE
St. Ann	984	Jan. 17, 1896		2,801	6,649.55
Concession	985	Jan. 17, 1896	1,380	506	17,748.64
Oak Point	987	Feb. 16, 1896		3,717	10,826.70
Live Oak	991	Mar. 7, 1896		3,540	6,942.65
Dobard	992	Feb. 16, 1896	410	5,770	16,018.88
Happy Point	993	Feb. 16, 1896		3,360	6,401.12
Turcan	995	Jan. 6, 1896		2,396	7,163.03
Alliance	997	Jan. 6, 1896		7,989	16,263.27
Star	994		2,160	2,035	18,282.55*
Ironton to Myrtle Grove	1000	Feb. 8, 1896		3,134	7,598.86
Myrtle Grove to Woodpark	1001	Feb. 3, 1896		6,757	11,552.97
Woodpark to Deer Range	1003			6,264	14,094.59*
Deer Range to Junior	1005			5,615	11,325.47*
Junior to Point Celeste	1006	Feb. 6, 1896		7,872	11,251.15
Point Celeste to Woodland	1008			12,900	28,373.79*
Diamond	1010		679	1,513	7,458.71*
Magnolia	1012	Mar. 6, 1896		6,955	3,822.85
Barthelmy to Riceland	1015		813	9,225	24,022.34*
				Total below the city	225.797.12

Making a grand total of 1,019,164.40 cubic yards.

* NOTE.—The levees on which the date of completion is omitted have not yet been completed and the yardage is estimated.

Respectfully submitted,
SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, La., August 4, 1894.

To the Honorable President and Commissioners for the Buras Levee District:

In anticipation of your organization and in order to furnish your Board with information and data as to the present condition of your levee line, we have had a line of levels run over the crown of these levees, and we have taken cross sections of such stretches as require raising and enlarging.

From the record of this survey, we find the length of your levee line to be 176,530 feet, or 33 $\frac{44}{100}$ miles, which we have divided into 5 sections, as follows:

Digitized by Google

SECTION	FEET	MILES	REMARKS
			Extends from—
No. 1.....	33,100	6.27	Lower line of Riceland to opposite P. Lyon's residence at Home Place.
2.....	33,170	6.28	P. Lyon's residence at Home Place to opposite lane to railroad at Green Metcalf's upper place.
3.....	33,515	6.35	Green Metcalf's upper place to opposite lower end of J. B. Fasterling's store.
4.....	33,980	6.44	Fasterling's store to lower line of U. S. Fort Jackson Reservation.
5.....	42,765	8.10	Lower line of U. S. Fort Jackson Reservation to the upper side of Jump.
Total.....	176,530	33.44	

A profile of each section has been drawn from which can be ascertained the present height of levee, the highest water mark, and other valuable information.

From the profiles we have prepared the following table of approximate yardage, basing our estimate on a section of earthwork to be added to present old levees of say, 6 feet crown, river slope 2 to 1 and land slope 3 to 1, and a net grade of 3 feet above the highest water mark. In this table also will be found the approximate yardage for new work in each section which may be required through caving of river bank, or the setting back of such levees as are too near the river bank to be enlarged; as almost the entire length of your levee line is very much exposed to abrasion by wave-wash from storms, steamships and other crafts plying the river during high water, we have recommended a slope of 2 to 1 on the river side, so that the section of new work can be more cheaply protected by a substantial plank revetment.

Such stretches of existing levees as require cleaning, cutting out of holes and minor repairs, and which are not to be replaced by new levees, or for the present to be raised and enlarged, should be placed at once in good condition.

This kind of work should be done under the supervision of the Local Commissioner, and cannot be estimated upon.

APPROXIMATE YARDAGE OF EARTHWORK REQUIRED

—TO—

Build, Raise and Strengthen Levees in the Buras Levee District, on the Mississippi River, from Lower Line of Riceland Plantation to the Upper Side of the Jump, to a Grade Three Feet Above Highest Water, with Crown Six Feet and Slopes Two and Three to One.

SECTION NO. 1.

STATION TO STATION	Linear Feet	Average Cubic Yds. per Linear Ft.	Number Cubic Yards	REMARKS
4 to 229	22,500	3	67,500	
229 to 242 04	1,300	.....	5,500	New levee 5½ feet average height.
242 04 to 269 74	2,770	3	8,310	
269 74 to 294	2,426	.....	12,000	New levee 6 feet average height.
294 to 331	3,700	3	11,100	
Total for Section No. 1.....			104,410	

Digitized by Google

SECTION NO. 2.

0 to 5	500	2¾	1,375	
30 to 65	3,500	.....	25,000	New levee 7½ feet average height.
118 75 to 320	20,125	2¾	55,345	
320 to 331 70	1,170	.....	6,000	New levee 6 feet average height.
Total for Section No. 2.....			87,720	

SECTION NO. 3.

0 to 22 80	2,280	.....	10,500	New levee 6½ feet average height.
22 80 to 35 40	1,260	2.5	3,150	
35 40 to 51 40	1,600	.....	9,000	New levee 6½ feet average height.
51 40 to 69 20	1,780	2.5	4,450	
69 20 to 93 20	2,400	.....	13,500	New levee 6½ feet average height.
98 40 to 108	960	....	5,250	New levee 6½ feet average height.
108 to 113 20	520	2.5	1,300	
117 74 to 157 05	4,000	.....	26,000	New levee 7 feet average height.
166 to 181	1,500	2.5	3,750	
181 to 186 80	580	.....	3,500	New levee 7 feet average height.
198 64 to 216 80	1,816	.....	10,000	New levee 6½ feet average height.
261 94 to 282 70	2,076	....	11,000	New levee 6½ feet average height.
298 72 to 319 10	2,038	.....	14,000	New levee 6½ feet average height.
319 10 to 334 15	1,505	2.5	3,760	
Total for Section No. 3.....			116,160	

SECTION NO. 4.

0 to 23 63	2,363	2	4,726	
23 63 to 133 40	10,977	2	21,954	
133 40 to 139	560	.....	2,800	New levee 6 feet average height.
139 to 146 75	775	2	1,550	
152 30 to 182 50	3,020	....	12,000	New levee and raising.
241 to 277 90	3,690	2	7,380	
277 90 to 291	1,300	.....	12,800	New levee in front of Fort Jackson 8½ feet average height.
291 to 340 80	4,980	2	9,960	
Total for Section No. 4.			73,170	

SECTION NO. 5.

0 to 238 85	23,885	2	47,770	
238 85 to 279	4,015	.....	16,000	New levee 5½ feet average height.
279 to 427 65	4,665	2	9,330	
Total for Section No. 5.....			73,100	

RECAPITULATION.

	Cubic Yards.
Section No. 1.....	104,410
Section No. 2.....	87,720
Section No. 3.....	116,160
Section No. 4.....	73,170
Section No. 5.....	73,100
Total.....	454,560

THE BOARD OF STATE ENGINEERS,
Per SIDNEY F. LEWIS,
Assistant State Engineer.

Digitized by Google

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, November 19, 1894.

Hon. Walter J. Crowder, President Board of Commissioners of the Caddo Levee District, Shreveport, La.:

DEAR SIR—In conformity with the resolution of your Board, passed at a meeting held on November 2, 1894, requesting the Board of State Engineers "to make a survey and examination for the purpose of ascertaining what lands, if any, are exempted from taxation for levee purposes, in accordance with Act No. 90 of the Acts of 1894," the Board of State Engineers, after having made the necessary survey and examination, has the honor to submit the following, viz:

The language of that part of the act referred to and bearing upon the question submitted, is as follows: "And no other lands embraced in this district shall be exempted from taxation or local assessment except such lands as are in the opinion of the Board of State Engineers so situated as not to be susceptible of protection from the waters of Red River by the levee district."

In the opinion of the Board of State Engineers, the land within the boundaries described below, is so situated as "not to be susceptible of protection from the waters of Red River by the levee district," with the means available under existing laws, viz: The land bounded by the bluffs bordering Soda Lake, Cross Lake and Cross Bayou, from a point at or near Albany, where the navigable channel of Twelve Mile or Soda Bayou touches said bluffs, to Red River, thence by Red River up to the line between sections 35 and 36 T. 19 N. R. 14 W., thence south on the line between sections 35 and 36 T. 19 N. R. 14 W., and sections 1 and 2 T. 18 N. R. 14 W. to Twelve Mile or Soda Bayou, thence by the navigable channel of said Twelve Mile or Soda Bayou to the point first mentioned at or near Albany.

Respectfully submitted,
THE BOARD OF STATE ENGINEERS,
Per HENRY B. RICHARDSON,
Chief State Engineer.

SHREVEPORT, LA., August 6, 1895.

To the President and Members of the Board of Commissioners of the Caddo Levee District, Shreveport, La.:

SIRS—Since the last meeting of your Board, certificates for final settlement have been issued by the Board of State Engineers upon all the levee work remaining in process of construction in the district.

This work was at Caspiana, Whitehall, Campo Bello, Cross Keys and at Beaird and Bonner's, carrying your line of levees, below Shreveport, down to the lower limits of the district. The work comprehended 2875 feet of enlargement, and 47,435 feet of new embankment, and aggregated 246,490 cubic yards of earth.

Digitized by Google

This line has since been extended by Mr. H. C. Stringfellow, in his own interest, across Cotton Point, to a junction with the levees on his place below. The work was built upon a location indicated by Mr. Stringfellow, but in accordance with dimensions recommended by this department, the line being 1780 feet long, and containing 5981 cubic yards of earth.

During the late high water in Red River, the cut-off at Cotton Point, in Grand Bend, which has been expected to occur for some years past, finally took place. To any one familiar with the situation, the work done by Mr. Stringfellow, in extending the levee line across Cotton Point, should, therefore, be recognized as an opportune and valuable adjunct to your levee system, not to speak of the benefit it will prove to the many in Red River parish below.

An incipient attempt was, about the time of the occurrence of the cut-off in Grand Bend, made to assist the river to cut through the narrow neck in Lovely Point. Fortunately it failed this time, but the risk of its succeeding at some future period of high water has increased.

In regard to cut-offs, their development should, in our opinion, be regarded with grave apprehension rather than favor, by both the local riparian proprietor and the community. This department looks upon the question of repeated cut-offs in so tortuous a stream as Red River with unqualified disfavor, believing that it means a continuance of serious disturbances in the regimen of the river which must tend to retard the work of establishing that uniformity of section and adjustment of slope so necessary to insure the future stability of its banks and the ultimate reduction of high water levels.

In reviewing occurrences since you were last together, it is with pleasure and satisfaction that we have to record that the work of enlargement and new embankment from "Coushatta to Hervey's Canal," known, under contract, as "Elmer Bayou Enlargement" and "Red Bayou Levee," was, on the 15th of July let out for construction by Capt. J. H. Willard, United States Engineer in charge of improvements on Red River, and that the work will very shortly be under way. The "Elmer Bayou Enlargement" was let to Mr. Hunt at 13½ cents per cubic yard, and the "Red Bayou Levee" to W. J. Bentley at 13.89 cents per cubic yard. The first named work is some 4½ miles in length, and involves the placing of about 52,000 cubic yards of earthwork upon the present line of levee from Coushatta to Red Bayou, and the second embraces a line of new embankment, extending from the upper terminus of the said enlargement, across Red Bayou, to a point some 3 miles up stream, and containing about 300,000 cubic yards.

The great importance and advantage of this work to the district can not be overestimated, and the relief it affords your Board, in providing means for continuing its efforts to establish a comprehensive levee system for the Caddo Levee District, should be duly appreciated.

Digitized by Google

As a further record of events, since your last session, reference should be made to the recent high water in Red River. A succession of freshets in the upper river finally culminated on the 29th and 30th of July in a high water wave registering 30.3 on the gauge at Shreveport, or 5.3 below the high water mark of 1892. From such information, however, as it has so far been possible to definitely obtain, the stage of the river at points above and below, where the improved conditions of the river are, from local causes, not so pronounced as in others, the difference between the heighth of this water and that of the highest of record did not exceed one and a half feet.

No abnormal conditions existed this year that did not exist in 1892 and 1894. On the contrary, the conditions this year tended to a reduction of flood levels.

The inference, therefore, is that a flood-wave but little differing in proportions from that of 1892 and 1894, passed down the river this time registering only 30.3 on the gauge at Shreveport, against 35.6 for 1892, and 34.4 for 1894, and that this result is due to the material enlargement of Red River within recent years, in consequence of the greater confinement of its waters to the main streams by means of levees, and the progress made by the General Government in the removal of obstructions from its bed.

Without going too deeply into details, this conclusion should be patent to anyone who has given the matter any degree of attention, and who has had access to the reports of the stages of the river published by the United States Signal Service Bureau, say since 1889. These show that the low water line at Shreveport has dropped from *two-tenths* of a foot below the zero of the gauge in 1890, to *five* and a *half* feet below the zero of the gauge in 1894. During all these years, navigation on Red River, such as it is in periods of extreme low water, was as good as, if not better, than during the years preceding, when the low water line was *above* the zero of the same gauge,—in some years as much as three feet. The conclusion readily suggests itself and, with a continuation of this deepening of the channel and enlargement of the section of Red River, demonstrated at Shreveport and elsewhere, flood heights, as given on the present gauge at Shreveport, will no longer be a safe indication of the proportions of the wave passing that point, as compared with the readings for past high waters on the same gauge.

This last view should, we think, be particularly considered and borne in mind by your people below Shreveport, and our remarks on the subject are submitted as a note of warning against drawing conclusions in the future as to probable effects, in the lower river, based upon the stage of the river as given upon the present gauge at Shreveport. The premises of the past will not, in our opinion, maintain.

The Board of State Engineers, however, wish it to be distinctly understood that it does not advance the belief that the high waters of the past will not be exceeded, but that, if the recent improvement in

Digitized by Google

the capacity of Red River continues, the high waters of the future will each season be carried down with less risk and danger to the levees and the interests of the valley.

The work of enlargement is steadily going on wherever Red River is confined, either by natural or artificial banks, but it must necessarily be slower in certain reaches, where adverse conditions must, through force of circumstances and the absence of means, be temporarily tolerated and suffered, than in others.

This is notably the case within the limits of your district, for some miles below Cottonwood Bayou and below Tone's Bayou, which, now that the closure of Red Bayou this season is assured, are the only remaining outlets from Red River of any magnitude, or of any special influence upon the river and its rectification within the limits of the district.

The levee line in your district, with one exception, does not seem to have been subjected to any very severe experience during this last high water. The exception referred to was at the lower end of the levee across Staten Point, abutting upon Tone's Bayou. Here the bulkhead at the end of the spur, on the upper side of the levee, was washed away by the water escaping from Red River across Staten Point and through Tone's Bayou into Bayou Pierre. Some fifty feet of the spur itself was also lost. The bulkhead at the end of the spur on the lower side of the levee was threatened with the same fate, but by the timely and energetic efforts and work of Mr. W. V. Robson, it was saved.

The accident to this work is, of course, a source of disappointment, but the damage sustained by the main line is so slight in comparison with what it would have been, had these bulkheads—unstable as they proved—not been built, that your Board should not by any means be discouraged.

Timely attention, no doubt, would have saved the upper as well as the lower bulkhead, but the place being somewhat isolated, the fact that it was in danger was not learned in time. Eternal vigilance along your whole line is the only safeguard against accident when the river is against your levees. The damage to the spurs and bulkheads at Tone's Bayou should be repaired before the next season of high water.

It may not be out of place to refer once more to the fact that your levee system, notwithstanding the amount and excellence of the work accomplished since the organization of your Board, is still far from complete. A considerable length of the river front of your district still remains unlevied, and from many causes, numerous places in the existing line require rebuilding and repairing. The care, preservation and protection of your line, too—including the guarding against abuses—has not yet been accorded anything like the systematic and effective consideration which it imperatively demands.

The Board of State Engineers would respectfully urge that these

Digitized by Google

facts be borne well in mind, and will be pleased at any time to supply the detailed information necessary for you to further any work in the direction suggested.

Respectfully submitted,
THE BOARD OF STATE ENGINEERS,
Per F. M. KERR,
Assistant State Engineer.

SHREVEPORT, La., April 3, 1895.

To the President and Members of the Board of Commissioners of the Bossier Levee District, Bossier City, La.:

DEAR SIRS—At a meeting of your Board, held on January 18, 1895, an appropriation of $17,500.00 was made for the construction of a line of levee from Knox Point to Buckhorn (in extension of your system), the State being requested to supplement this amount by the sum of $5000.00 and to advertise for proposals to build the line. The Board of State Engineers promptly recommended that the amount requested be allotted from that part of the General Engineer Fund known as the Caddo Subdistrict Levee Fund, upon which it was once advertised by the Governor, and, on February 2, 1895, a contract for building the line was awarded to Hunter Bros., of Shreveport, for the sum of $3497.00.

The line is 32,377 feet in length, and when completed will contain 199,017 cubic yards of earthwork, making its cost to the district and State a fraction less than eleven cents per cubic yard.

The contractors promptly commenced the work, and have so far made such fair progress as to warrant the expectation that the entire line will be completed within the contract time—May 15, 1895.

I have also the honor to report the completion of the line of levee from Waterloo Point to Navigator Point, more generally known as the Magenta levee, undertaken by your Board, as well as the line from Scopini to Ash Point, generously undertaken by the General Government in recognition of its great importance to the district and the strenuous efforts put forth by your Board for protection from the waters of Red River.

The line from Waterloo Point to Navigator Point is 9984 feet long and contains 131,787 cubic yards, and that from Scopini to Ash Point is 13,450 feet long, aggregating 265,000 cubic yards, and costing about $38,000.00.

Including the lines of levee aboved named, aggregating ten and a half miles in length, the levee line in your district now extends continuously from Hurricane Bluff, above Shreveport, to Buckhorn Plantation below, a distance by river of about seventy-three miles. All of this line has been built, or improved, to a grade 3 feet above the high water marks of 1892, and to a section generally approximating six (6),

Digitized by Google

feet in width at the crown, with side slopes of 3 and 3 to 1, except at Buck Hall, Cash Point and Benoit's Bayou to Dillard's, above Shreveport, and Sunflower and Hall's below.

The requirements at these localities should command the attention of your Board at the earliest possible time, as well as the fact that new levees are needed at Taylor's, above Shreveport, where the present line is threatened by caving, and from Buckhorn plantation to the lower end of the district, in the neighborhood of Swift Chute Bayou, where no attempt has yet been made to construct public levees.

To sum up, it will be seen that by the combined efforts of your Board (under the authority vested in it by the State), the General Government, the State of Louisiana, and a limited amount of private contribution, the Bossier Levee District has, within the past three years, acquired a continuous line of levee along its front—except about twelve miles by river, at its lower end—all of which can be said to offer, as far as it goes, a reasonable assurance of security against such high waters as have so far visited Red River, unless grossly neglected and abused.

This exhibit should give satisfaction to all concerned. The question of its appreciation by the interests depending upon its integrity remains to be shown, and when the fact, alone, that to accomplish the end so far reached, not less than $375,000 have been invested is considered, the Board of State Engineers may be pardoned for its frequent recurrence to the subject of the care, preservation and maintenance of the work.

Under the laws, this duty for caring for, preserving and maintaining the lines of public levee, devolves upon the Board of Commissioners of the district, and these laws are so many, so full and so far reaching in the purposes for which they have been framed, that a disaster resulting from a failure to apply all the resources, as well as the remedies against neglect and abuses, therein provided for, must necessarily reflect directly upon the Board of Commissioners of the district itself; so that the flagrant disregard of the laws regulating these matters and the serious abuses to the levees existing in numerous localities in the district, which probably your Board as a whole may not be fully cognizant of, appears to so immediately concern you that the Board of State Engineers respectfully suggests that your Board, as a body, at its earliest possible convenience, make a careful and thorough tour of inspection of the entire line of levee in the district to more fully convince its several members of these facts.

Respectfully submitted,

THE BOARD OF STATE ENGINEERS,

Per FRANK M. KERR,

Assistant State Engineer.

Digitized by Google

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, September 4, 1895.

To the Honorable Board of Levee Commissioners of the Bossier Levee District, Bossier City, La.:

SIRS—You have been called together by your president, at this time, as we understand, to consider and discuss the further necessities of the district, and to provide the ways and means to secure them.

In this connection, the Board of State Engineers would respectfully submit the following remarks and recommendations:

The levee work so far executed in the district, since the organization of your Board, has been very large in amount and generally distributed to do the greatest good to the greatest number, and the improvement in the condition of the district is, in consequence, very great and very satisfactory, but the system, as a whole, is yet far from what is required to insure protection from overflow to the district at large.

The entire front of your district has not yet received the attention it demands, no public effort having thus far been made during the existence of your Board for the improvement of the levees at Buckhall, the greater part of Cash Point, Benoit Bayou to Dillard's, and from Buckhorn to the lower limit of the district. Moreover, conditions are constantly arising in one locality, and then another, which tend to impair to a greater or less extent, the efficiency of the work already executed, and to call for the further improvement of existing lines.

This impairment results from changes in the river, due to the greater confinement of the floods which visit it as the work of the Bossier and Caddo Levee Districts progresses, causing the enlargement of the section of the river by caving and scouring, and the adjustment of high water slopes to new local conditions.

The points at which work at this date is demanded in consequence of changes of condition, are as follows: First, from caving banks, Taylor's Pandora, Colquitt's to Dillard's and Hall's; second, from adjustment of high water slope, Hurricane Bluff to Pandora, and from Magenta to Lovely Point.

To recapitulate, the Board of State Engineers would, at this date, respectfully submit the following urgent recommendations, viz.:

The enlargement of the present line of levee from Hurricane Bluff to Taylor's; a new levee at Taylor's; the enlargement of the present line of levee from Taylor's to Buckhall; a new levee and the enlargement of a part of the old levee at Buckhall; a new levee and the enlargement of a part of the old levee at Cash Point; the enlargement of the present levee at Shady Grove; a new levee from Shady Grove to Carmouche's; the enlargement of the present levee from Carmouche's to Jeters'; sections of new levee and the enlargement of parts of the old levee from Jeters' to Dillard's; a new levee at Hall's; the enlargement

Digitized by Google

of the present line of levee from Magenta to Lovely Point; a new levee from Buckhorn to the lower limits of the district. This will involve not less than 900,000 cubic yards of earthwork.

In the event, however, of the inability of the district to at once undertake this amount of work, that set forth as required at the following named points may, at this date, be selected as of prime importance and imperative necessity to the district at large, viz.: Hurricane Bluff to Taylor's; Taylor's, Buckhall, Cash Point, Pandora, Hall's and from Magenta to Lovely Point.

In conclusion, the Board of State Engineers desires to again impress upon your Board, the imperative necessity for the adoption of regulations to insure the protection of the levees from the many abuses from which they are daily suffering, and the formulation of plans to at once repair them and keep them in repairs.

The condition of the levees in many parts of the district, resulting from neglect and abuse, is simply disgraceful, and unless promptly remedied cannot but seriously reflect upon your Board, in whose hands the law has placed all the power and authority necessary to make and enforce such regulations as are required to insure their proper care, preservation and protection. Many instances of neglect and abuse can be cited which may be pronounced as forerunners of disaster to the district in the event of extreme high water.

Detailed estimates of the amount of work required at any particular point will be promptly furnished whenever requested by your Board, as well as any other engineering work which you may deem necessary in the interest of the district.

Very respectfully submitted,

THE BOARD OF STATE ENGINEERS,

Per FRANK M. KERR,

Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
October 30th, 1895.

Hon. Jos. H. Meeker, President Board of Commissioners
R. R. A. and B. B. Levee District, Alexandria, La.:

SIR—The special object of this meeting of your Board, as we understand it, is to review the condition of the levees in the district, and to determine what part of the additional levee work required to perfect your system it is possible for your Board to undertake at this time Except for the work executed by the State in Rapides Parish, during the past season, the condition of the levees of the district has not advanced since the last report on the subject made to you.

Digitized by Google

This report set forth that the proportion of improved to unimproved levees in the length of levee line in the district to which attention so far has been directed, was about as follows:

On Red River.....50% improved; 50% unimproved.
On Bayou des Glaizes.....33% improved; 67% unimproved.
On Atchafalaya River.....85% improved; 15% unimproved.

This proportion remains practically the same to-day, with the exception of that part of the line on Red River already referred to, where the percentages may at this time be rated at about 80% improved and 20% unimproved, including the State work at present under way.

The number of cubic yards of earthwork required to adjust these percentages to a uniform standard, and to cover probable caves, is about as follows:

On Red River.....	225,000 Cubic Yards.
On Bayou des Glaizes.....	750,000 Cubic Yards.
On Atchafalaya River.....	210,000 Cubic Yards.
Total.....	1,185,000 Cubic Yards.

In addition to this, the levee lines on all of these streams require extension, as heretofore pointed out, which will involve not less than 700,000 cubic yards.

Again, the extensions when completed, will make it necessary to improve and provide drainage for several basins in the district which now find natural escape for accumulated rain water at points which the extensions will close.

And finally, the care, preservation and protection of the line when built and improved imperatively demands constant systematic attention to provide which you cannot too soon direct your best energies.

The Board of State Engineers respectfully recommends that all of this work be provided for as rapidly as the means of the district will permit, and that as much as possible of the most urgent of it be undertaken this season; under which classification, we would include the following localities named in the order of their immediate importance:

Bayou Rouge to Melville—Atchafalaya,	50,000 Cubic Yards.
Yellow Bayou to Simmsport—Bayou des Glaizes.....	50,000 Cubic Yards.
Bordelonville—Bayou des Glaizes.....	50,000 Cubic Yards.
Spurlock's to Mill Bayou—Bayou des Glaizes.....	200,000 Cubic Yards.
Choctaw Bayou and Tanner's Ditch...	200,000 Cubic Yards.
Total.....	550,000 Cubic Yards.

Respectfully submitted,

THE BOARD OF STATE ENGINEERS,
Per F. M. KERR,
Assistant State Engineer.

Digitized by Google

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, Dec. 18, 1894.

To the Honorable President of the Police Jury,
Parish of Caddo, Shreveport, La.:

SIR—The Board of State Engineers has the honor to acknowledge the receipt, through Messrs. Bell & Randolph, attorneys at law, of a copy of a resolution passed by your body relative to the exemption of certain lands from taxation for levee purposes, under Act No. 90 of 1894, and signed by A. L. Dunniger, clerk of the Police Jury, requesting and calling upon the Board of State Engineers "to run lines and locate "levees and make a survey and examination" of the following named plantations, "and determine what portions thereof are exempt from "said taxation and what portions thereof are not susceptible of protec- "tion from the waters aforesaid," etc., viz: "South Side Plantation, "Hayne's Place, and Buck Hall, in Caddo, beloging to S. J. Ziegler, "and Riverside Plantation, in Caddo, bel nging to W. C. Vance, and "the Caddo side of Gold Point Plantation, all in the Levee District of "Caddo."

In reply, the Board of State Engineers would respectfully represent that Act No. 90, of 1894, does not require it "to run lines and locate levees," to determine what "portions" of any plantation are exempt from taxation for levee purposes, but to make such surveys and examinations as may be necessary to determine what lands in the district, "if any there be," are, in its opinion, "so situated as not to be susceptible of protection from the "waters of Red River by the Levee District;" and that in conformity with the request of the Board of Commissioners of the Caddo Levee District, the Board of State Engineers has made the necessary survey, examination and report under date of November 19, 1894, to determine what lands in the district are, in its opinion, so situated; and that the lands of the properties described in your resolution are not included therein.

A copy of the report to the Board of Commissioners of the Caddo Levee District is herein enclosed for your information.

Very respectfully,
THE BOARD OF STATE ENGINEERS,
Per HENRY B. RICHARDSON,
Chief State Engineer.

Digitized by Google

APPENDIX C—PLATES.

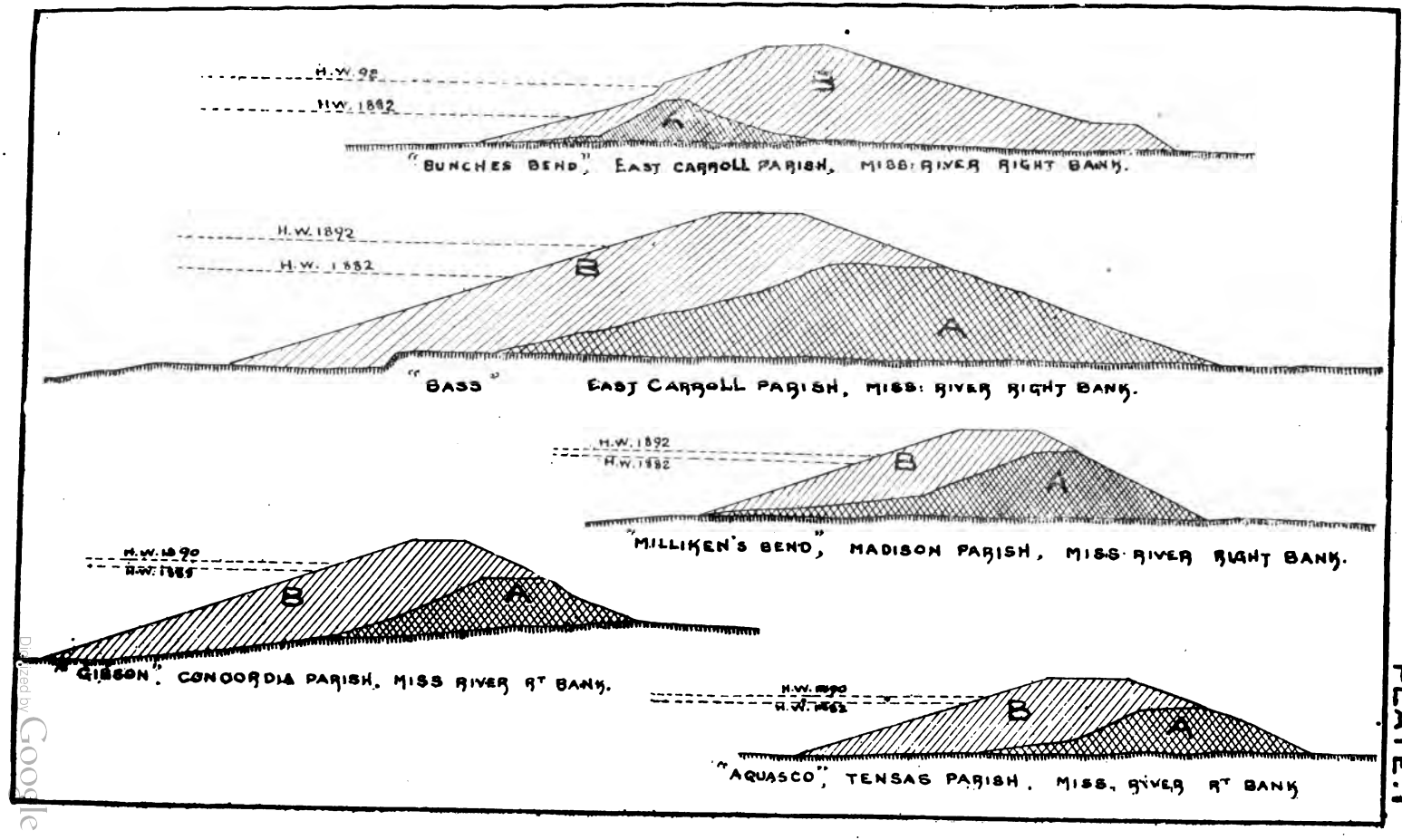
The following Plates, numbered from 1 to 10, inclusive, are intended to illustrate the improvement made in the Height and Base of the Levees during the period extending from 1882 to 1896.
Parts of Sections marked "A" represent the Old Levee.
Parts of Sections marked "B" represent Improvement.

The cross-sections are from records of actual measurements, and are drawn to a scale of twenty feet to one inch. They have not been selected with special reference to anything except locality, being simply so distributed as to show the general improvement in all parts of the State. They are also indicative only of what has been thus far accomplished in the several parishes bordering upon the streams on which the building of public levees has been systematically prosecuted. It is not intended, either, to show by these sections that all parts of the levee line have been equally improved, nor that the improvement so far made is all that may prove necessary in the future.

Plate 11 is a Profile showing the relative position of the United States River Gauges, between Cairo and Fort Jackson, on the Mississippi River, with High and Low Water Lines, etc.

Digitized by Google

Digitized by Google



Digitized by Google

APPENDIX. C.

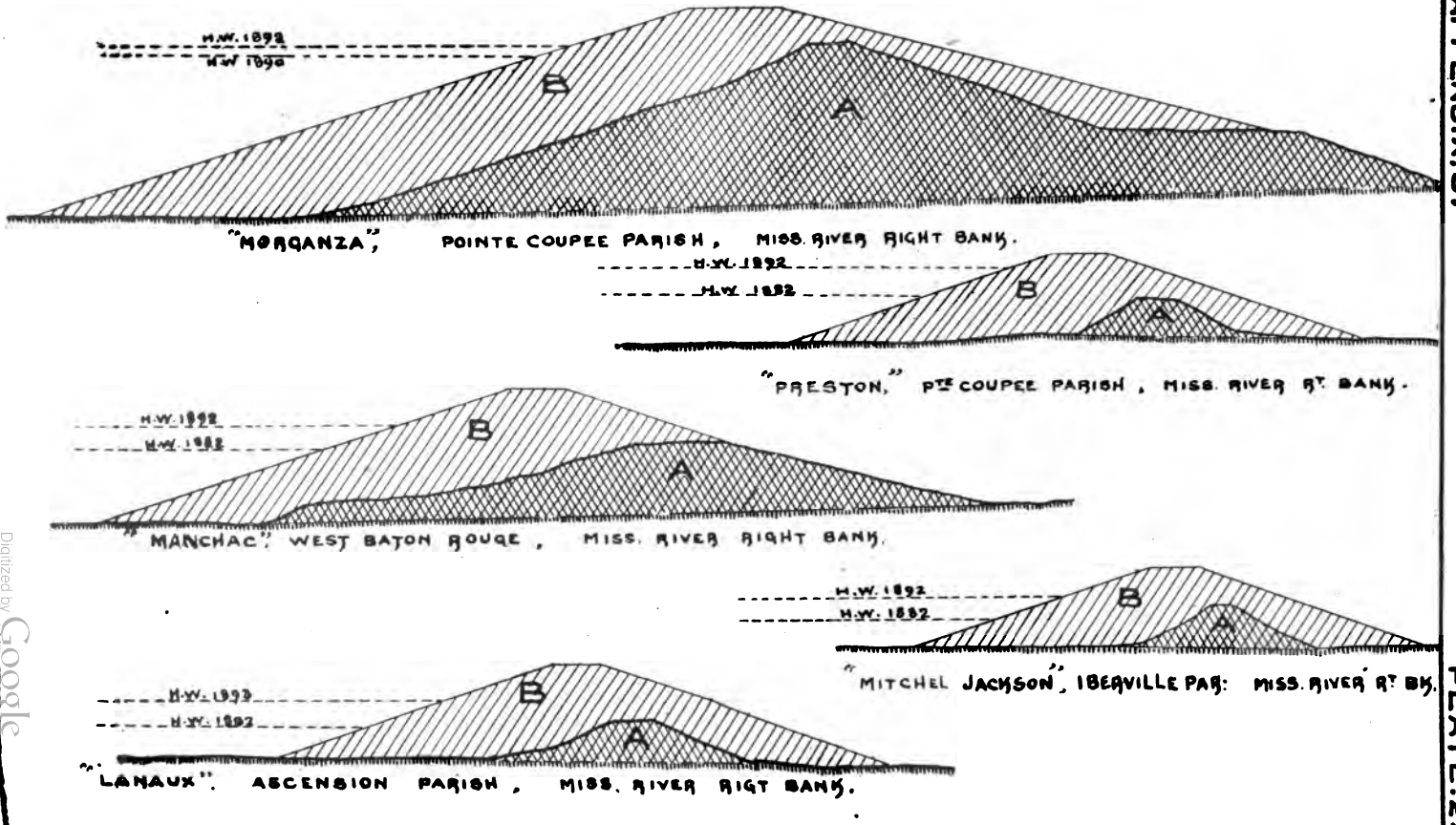
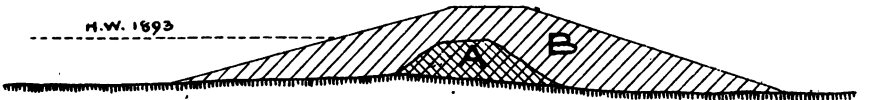


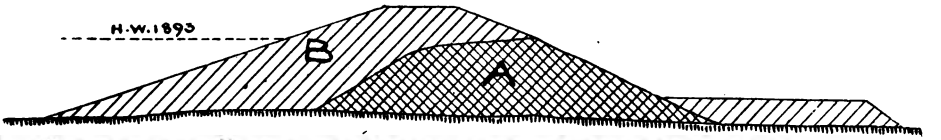
PLATE. 2.

Digitized by Google

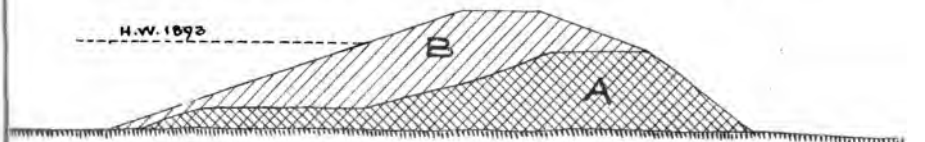
"LOWER COFIELD", ASCENSION PARISH, MISS: RIVER ST BANK.



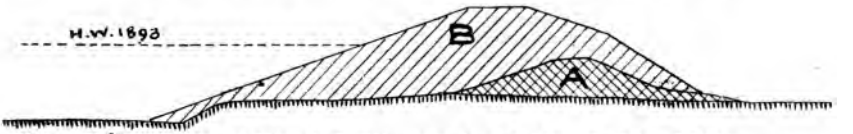
"BONSECOURS", ST JAMES PARISH, MISS: RIVER RIGHT BANK.



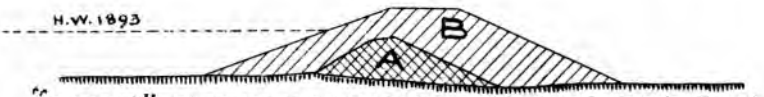
"SONGY STORE", ST JOHN PARISH, MISS: RIVER RIGHT BANK



"LOUISA", ST CHARLES PARISH, MISS. RIVER RIGHT BANK.



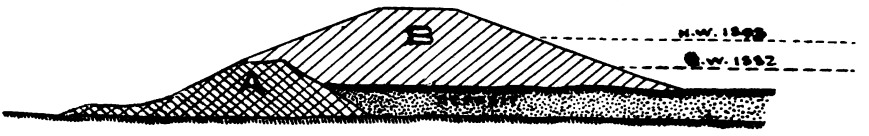
"ODIER", JEFFERSON PARISH, MISS: RIVER RIGHT BANK



"SARAH" PLAQUEMINES PARISH, MISS: RIVER RIGHT BANK.

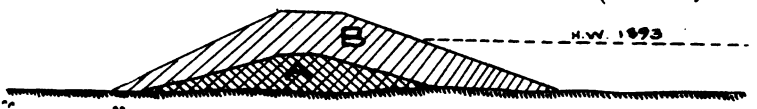
BURAS" PLAQUEMINES PARISH, MISS: RIVER RIGHT BANK.

Digitized by Google

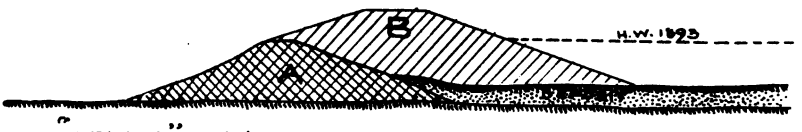


"BATON ROUGE", EAST BATON ROUGE PARISH, MISS. RIVER RIGHT BANK

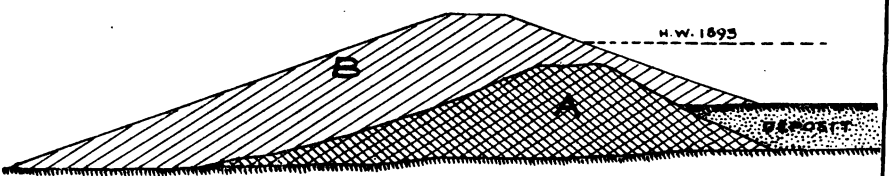
"INDIAN CAMP", IBERVILLE PARISH, MISS: RIVER LEFT BANK.



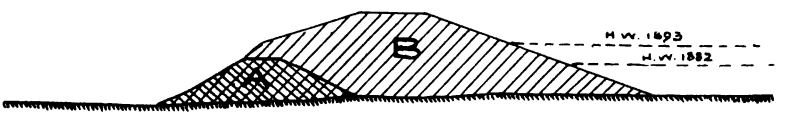
"BOCAGE", ASCENSION PARISH, MISS. RIVER LEFT BANK



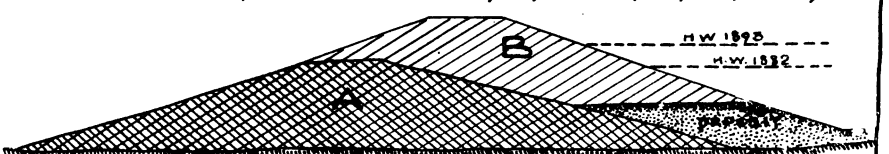
"WELHAM", ST JAMES PARISH, MISS. RIVER LEFT BANK



"LOUQUE", ST JOHN PARISH, MISS: RIVER LEFT BANK.



"PECAN GROVE" ST. CHARLES PARISH, MISS RIVER LEFT BANK

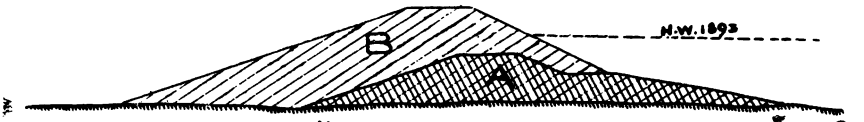


"SAUVE", JEFFERSON PARISH, MISS RIVER LEFT BANK.

"BATTLE GROUND", ST BERNARD PARISH, MISS: RIVER LEFT BANK.

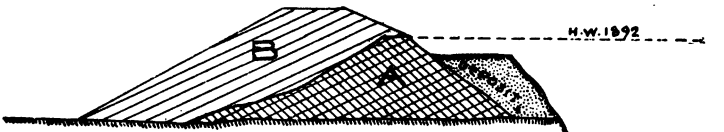
"LOWER PTE A LA HACHE," PLAQUEMINES PARISH, MISS: RIVER L^T BANK.

Digitized by Google

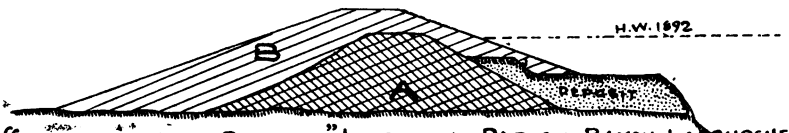


"CRESCENT QUARTERS", ASCENSION PARISH, BAYOU LAFOURCHE, LEFT BANK.

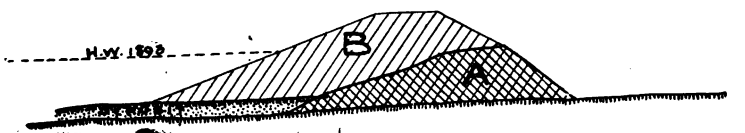
"COMI TRUXILLO", ASSUMPTION PARISH, BAYOU LAFOURCHE LEFT BANK,



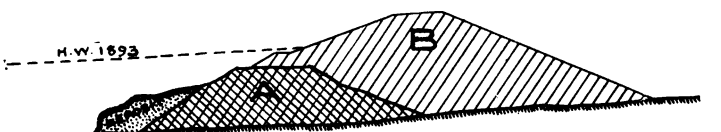
"ST JOHN STORE", LAFOURCHE PARISH, BAYOU LAFOURCHE LEFT BANK.



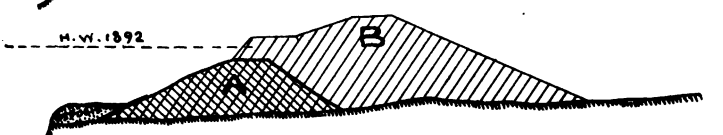
"SOUTHERN PACIFIC CROSSING", LAFOURCHE PARISH, BAYOU LAFOURCHE LT. BANK.



"COX", ASCENSION PARISH, BAYOU LAFOURCHE RIGHT BANK.



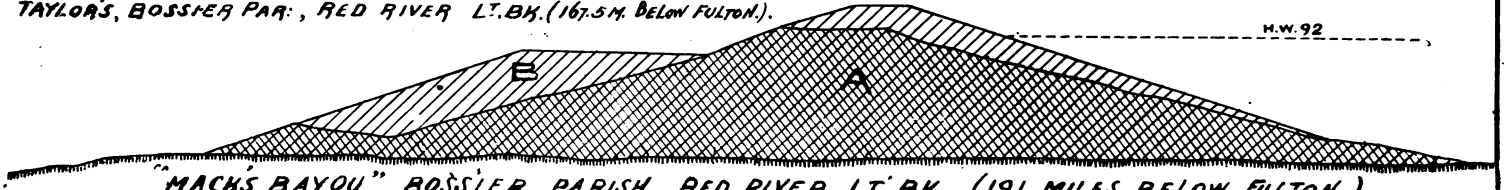
"GARRETT", ASSUMTION PARISH, BAYOU LAFOURCHE RIGHT BANK.



"LAFOURCHE CROSSING", LAFOURCHE PARISH, BAYOU LAFOURCHE RT. BANK.

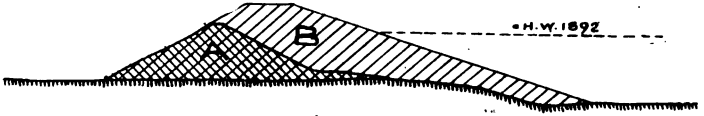
Digitized by Google

"TAYLOR'S", BOSSIER PAR:, RED RIVER LT. BK. (167.5 M. BELOW FULTON).



"MACK'S BAYOU", BOSSIER PARISH, RED RIVER LT. BK. (191 MILES BELOW FULTON.).

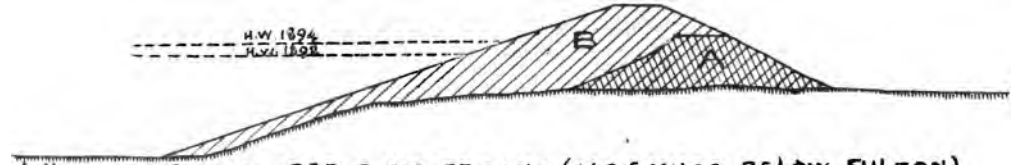
"NICHOLSON'S" BOSSIER PAR. RED RIVER LT. BK (194.75 M. BELOW. FULTON).



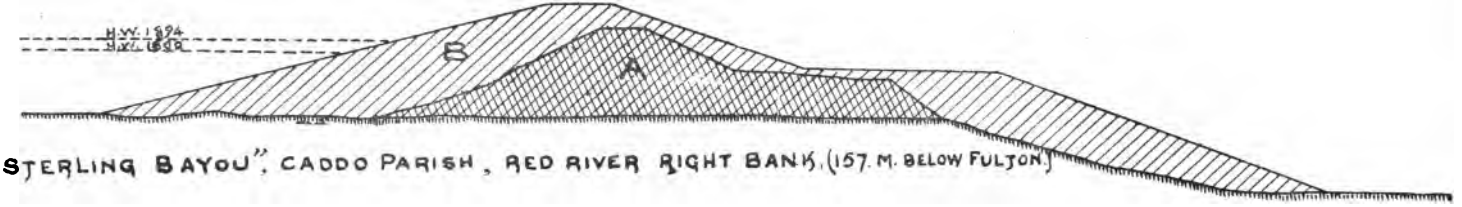
"SUNFLOWER", BOSSIER PARISH, RED RIVER L. BK. (195.5 BELOW FULTON).

"CURTIS". BOSSIER PAR: RED RIVER LT BK. (198.5 MILES BELOW FULTON).

Digitized by Google



"DOLE'S", CADDO PARISH, RED RIVER RT. BANK. (140.5 MILES BELOW FULTON).



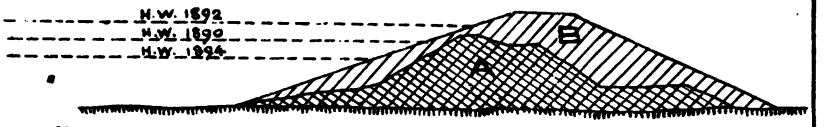
"STERLING BAYOU", CADDO PARISH, RED RIVER RIGHT BANK. (157. M. BELOW FULTON.)

"CORNER PLACE", CADDO PARISH, RED RIVER RT BK. (159 M. BELOW FULTON.).

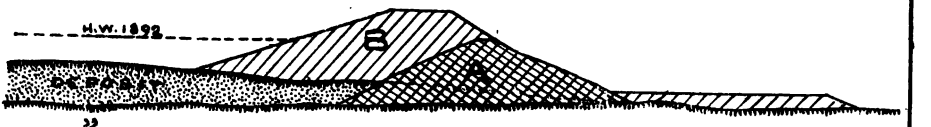
"HART'S" ISLAND", CADDO PARISH, RED RIVER RT BK. (193 M. BELOW. FULTON.).

"ASHWOOD", CADDO PARISH, RED RIVER RT BK. (216 5 M. BELOW FULTON.)

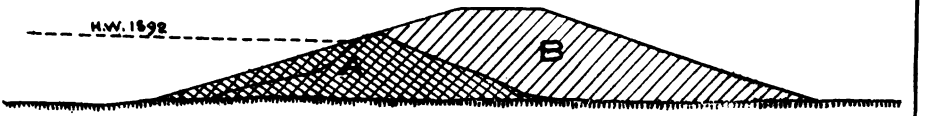
"COTTON POINT", CADDO PARISH, RED RIVER RT BK. (244 MILES BELOW FULTON).



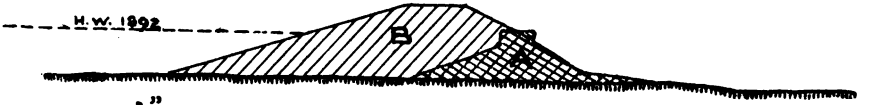
"ALEXANDRIA", RAPIDES. PAR: BAYOU RAPIDES LT. BK. (397.5 BELOW. FULTON.



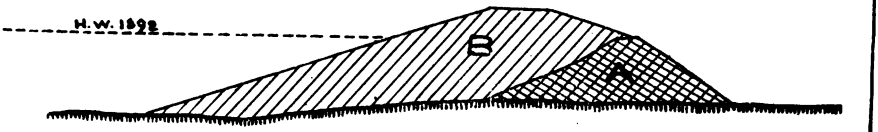
"ASHTON", RAPIDES PAR: RED RIVER RT. BK. (404.5 MILES BELOW FULTON).



F.M. PEARTS, RAPIDES PARISH, RED RIVER RT. BK. (409 M. BELOW FULTON).

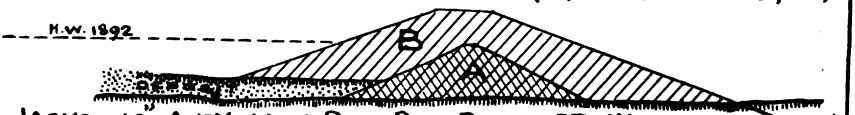


JACK WILSON'S, RAPIDES PARISH, RED RIVER RT. BK. (455.5 M. BELOW. FULTON).



WM WILSON, RAPIDES PARISH, RED RIVER RT. BK. (412 MILES BELOW FULTON).

B.T. LEWIS, RAPIDES PARISH, RED RIVER RT. BK. (417.25 M. BELOW FULTON).



ROBT JACKSONS, AVOYELLES PAR; RED RIVER RT. BK. (427.75 BELOW FULTON).

BRINGOLD, AVOYELLES PAR. RED RIVER RT. BK. (428.5 M. BELOW FULTON).

Digitized by Google

"BORDELONVILLE", AVOYELLE PARISH, BAYOU DES GLAIZES RT BK.

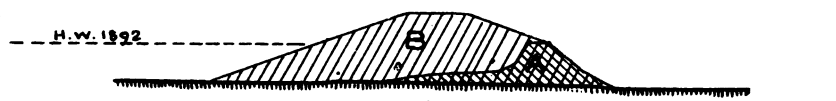
"RUSH'S", AVOYELLES PARISH, BAYOU DES GLAIZES RT BANK.

"HAMBURG", AVOYELLES PARISH, BAYOU DES GLAIZES RT. BANK.

"GLENWOOD", AVOYELLES PARISH, ATCHAFALAYA RIVER RT BANK.

"KIRKWOOD", AVOYELLES PARISH, ATCHAFALAYA RIVER RT BANK.

"HEATHERWICK", AVOYELLES PARISH, ATCHAFALAYA RIVER RT BANK.



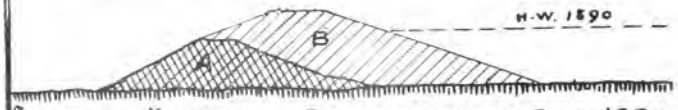
"WOODSIDE", AVOYELLES PARISH, ATCHAFALAYA RIVER RT BK.

"DICKEY", ST LANDRY PARISH, ATCHAFALALAYA RIVER RT. BK.

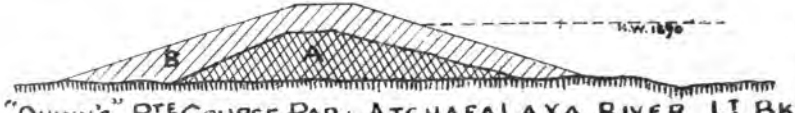
"AUSTRALIA", ST LANDRY PARISH, ATCHAFALAYA RIVER RT BK.

"DAVIS BAYOU (ELBA), ST LANDRY PAR: ATCHAFALAYA RIVER RT BK.

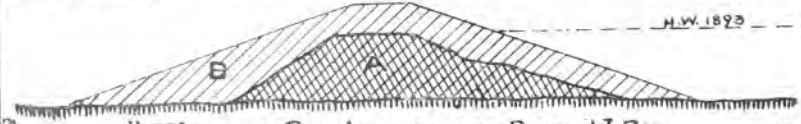
Digitized by Google



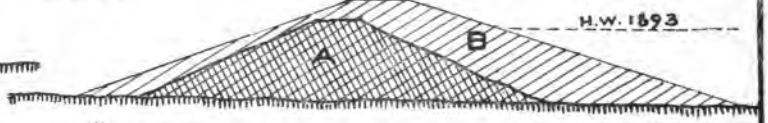
"TANGLEWOOD", PTE COUPEE PAR: ATCHAFALAYA RIVER LT BK.



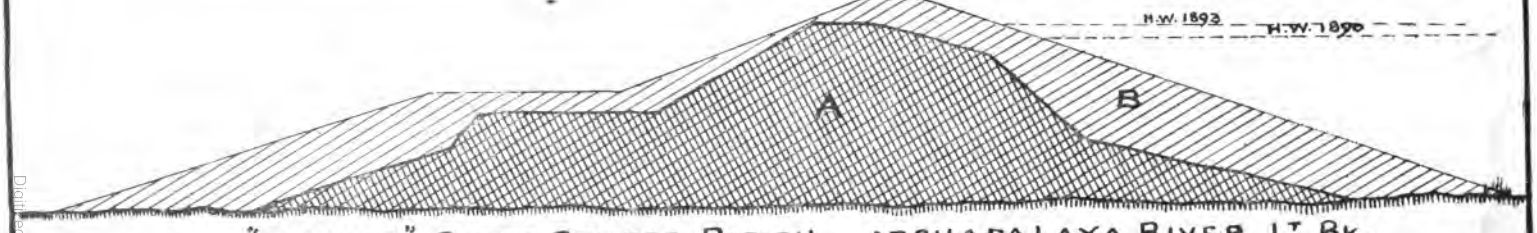
"QUINN'S", PTE COUPEE PAR: ATCHAFALAYA RIVER LT BK.



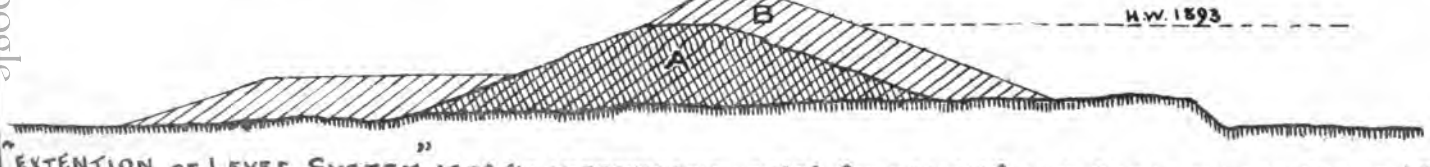
"LUCKY-HIT," PTE COUPEE PAR: ATCHAFALAYA RIVER LT. BK.



"SIMMONS", PTE COUPEE PAR: ATCHAFALAYA RIVER LT. BK.



"BURRUSS," POINTE COUPEE PARISH, ATCHAFALAYA RIVER LT. BK.



"EXTENTION OF LEVEE SYSTEM. 1892 AND IMPROVEMENT OF 1896. POINTE COUPEE PARISH, ATCHAFALAYA RIVER LT BK.

Digitized by Google

Digitized by Google

Digitized by Google

UNIVERSITY OF MICHIGAN
3 9015 06718 5010

INDEX.

	PAGE.
Acts creating Levee Districts	3
Acts for Improvement of Levee System	22
Allotment of U. S. Funds for Levees	21
Amount and Cost of Levee Work	5, 25
Since 1882	25
During past two years	5, 78, 81
Arkansas Levees, condition of	85, 87
Atchafalaya Basin Levee District	7, 46
Reports to Commissioners of	95, 102
Average Prices of Levee Work	79, 81
Bank Revetment at Elton	7
Bayou Lafourche, closure by dike or locks	98
Board of State Engineers, duties of	3
Reports to Commissioners of	115, 118
Bossier Levee District	15, 60
Bougere Crevasse	7
Reports as to Lands Overflowed by	88
Buras Levee District	13, 56
Report to Commissioners of	109
Caddo Levee District	14, 58
Report to Commissioners of	111
Canal, New Basin and Shell Road	17
Cat Island Levee District	9
Condition of Levee System prior to 1882	19
Cost and Amount of Levee Work	5, 25
During the past two years	5, 78, 81
Since 1882	25
Cost of Suit, involving right to build levees, borne by Fifth Louisiana Levee District	18
Crevasses open in 1882	19
Decisions of Courts influencing Improvement of Levees	22
Duties of the Board of State Engineers	3
Elridge vs. Trezevant	18
Elton Bank Revetment	7
Employees of Board of State Engineers	4
Exemption of Lands from Levee Tax—	
Caddo Parish	111, 120
Concordia Parish	7, 88
Extension of Levee System since 1882	23
Fifth Louisiana Levee District	6, 44
Reports to Commissioners of	88, 95
Grade of Levee—	
Present Elevation above H. W	25
Suggested proper heights	28, 29
Heights of Levees Needs Increase	29, 30
Improvement of Levee System (See plates Appendix C.) and	19, 30
Since 1882	19, 25
Still needed	25, 30
Lafourche Basin Levee District	11, 52
Reports of Commissioners of	102, 108
Lafourche, Bayou, closure by dike or locks	98

Digitized by Google

Lake Borgne Levee District 12, 54
Levee Districts, the 5, 17
Atchafalaya Basin 7, 46, 48
Bossier 15, 60
Buras 13, 56
Caddo 14, 58
Cat Island 9
Fifth Louisiana 6, 44
Lafourche Basin 11, 52
Lake Borgne Basin 12, 54
Orleans 12
Pontchartrain 10, 50
Red River, Atchafalaya and Bayou Bœuf 16, 62
Tensas Basin 6, 42
Acts Creating Districts 3
Levee System, Improvement of 19, 25
Acts for Improvement of 22
Condition of, previous to 1882 19
Decisions of Courts influencing 22
Extension since 1882 23
Further improvement needed 25, 30
Levee Work of the past two years 5, 78, 81
Since 1882 25
Of the United States, tabular statements of 64, 77
Locks at head of Bayou Lafourche 98
New Basin Canal and Shell Road 17
Pontchartrain Levee District 10, 50
Prices of levee work (see tables in Appendix A) 34, 81
Private property, right of State to build levees on 18
Red River, Atchafalaya and Bayou Bœuf Levee District 16, 62
Report to Commissioners of 118
Revetment at Elton 7
Right of State to build levees on private property 18
Rivers, stage of during past two years 30
Stage of rivers during past two years 30
Of the Arkansas River in December, 1895 87
Of the Red River in July, 189.....5 113
State's right to build levees on private property 18
State contracts, tabular statement of detail (Appendix A) 34, 41
Tensas Basin Levee District 6, 42
Report to Commissioners of 85
Tax for levee purposes, exemption from—
Caddo Parish 111, 120
Concordia Parish 7, 88
United States levee work, tabular statements as to 64, 77
United States funds allotted for levees 21

Digitized by Google